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NEW SOUTH WALES
VK2WI, Sundays, at 1100 hours E.A.S.T.
3595 Kc. a.m. — 145.130 Mc. a.m.
7146 Kc. a.m. — 148.000 Mc. f.m.
53.866 Mc. a.m. — [53.950 Mc. f.m. proposed shortly)

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FEDERAL COMMENT

The Year in Review

As mentioned in last month's issue, the development of Region III. activities has probably been the highlight of the year. Since the Federal President's comment we have now received agreement to the Region III. interim constitution from the Philippines. In a letter from Emilio DU1EA, a further amendment is made to the status of the Amateur Radio organisation in that country, and we can do no better than quote the relevant section:

"In view of the establishment of a new organisation of Radio Amateurs in the Philippines, viz. 'Philippine Amateur Radio Service Inc.' (P.A.R.S.), the other Societies—P.A.R.A. and P.A.R.L.—are now only chapters of P.A.R.S. The P.A.R.S. will now replace P.A.R.A. for purposes of membership with the I.A.R.U., and is the only organisation, of which I am the President, recognised by the Philippine Government".

We congratulate Emilio and note with interest his last point.

Our domestic scene can be viewed in the light of progress, too, and arising from the Federal Convention discussions last Easter, a committee was formed to investigate all aspects of "A.R." By the time this is read, copies of the report should be in all Divisions and you are urged to read it and become informed of the many problems confronting the Editor and his Committee.

Nearly all matters arising from this Convention have been dealt with, although a proposal that some sort of code proficiency test be run is still being worked out in conjunction with the VK7 Division.

We also saw the very liberal provisions by the Postmaster-General's Department in reply to our request to use v.h.f. repeaters, and in the subsequent enthusiasm resulting in a conference at Wodonga, many plans have been made for operational repeaters. This Institute felt that the frequencies and modes proposed were worthy of adoption as policy and they are being considered by Divisions. There does appear, however, to be some aspects at variance with the Tasmanian group's thoughts on the matter and it is hoped that the VK2 repeater secretariat can assist in providing a solution.

Whilst speaking of v.h.f., we would refer you to the published statement, shown elsewhere in this issue, from the I.T.U. Administrative Council. Any comment from us at this stage would be pure speculation, but you should be aware that we are being kept informed of all and any developments. When a more specific agenda is available—perhaps during the middle of this coming year—we will know a little more, and can form a more specific judgment. Whilst our Amateur bands 144 Mc. and above are slotted into the part of the spectrum under review, the preparations to try and counter any inroads by other services are no less stringent than they would be for h.f. bands.

Your Federal Councillor and Division will be asking you for reports on v.h.f. activities and achievements, and we suggest that this information be provided as soon as possible. The significance of this information, or the lack of it, will be obvious.

It is interesting to note that in this country, the number of civil radio communication stations between 148 and 174 Mc. amounted to 14,500 over twelve months ago. In nine months, the total number of stations in Australia increased from 93,000 to 102,000—so the commercial and civil users have their problems too.

Before leaving you with thoughts of holidays and/or the work to be done around the house, we should mention that you could find time perhaps to suggest ways of improving the national society that represents you, viz. the W.I.A., or the conditions under which we are allowed to operate.

Next Easter, the Federal Convention may be held in Canberra, but no matter where, all Federal Councillors will meet to consider and review past policies, up-date them if necessary, and introduce new ones.

Your suggestions are valued and your Division will be eager to consider all proposals put before it, no matter if it concerns DX, contests, regulations, finance or administration—so while dangling that line or contemplating the beauty of your favourite holiday retreat, why not slip in the thought to do something positive when you return to civilisation?

In the meantime, our best wishes for a pleasant and relaxing Christmas season, with a prosperous 1969 in the offing. With 73 from Federal Councillors: Pierce VK2APQ, Deanne VK-3TX, David VK4DP, Geoff VK5TY, Neil VK6ZDK, Ted VK7EJ, and your Federal Executive: John VK3OR, Michael VK3KI, Peter VK3IZ, David VK-3QV, George VK3VX, Alf VK3IE, and Kevin VK3ARD.

A TRANSVERTER FOR 21 OR 28 Mc.

AL RECKNER,* VK5EK

THIS article is written in response to many requests received over the air. I was hesitant to describe this device in "A.R." as several of the parts used are not available "over the counter". This must not, therefore, be regarded as a detailed constructional article, but merely a description of a unit which works very well and from which erstwhile constructors may obtain some hints.

Many owners of three-band transceivers would like to be able to operate on the 21 and 28 Mc. bands, especially at this time of the sunspot cycle. Although this unit was built for 28 Mc. the design is amenable to either or both bands, and probably performs better on those bands than a five-band transceiver.

The circuit consists of a conventional crystal controlled converter, which converts the 28 Mc. signals to 3.5 Mc., using the three-band transceiver as a tuneable i.f. On transmit, the full output of the transceiver is dissipated in a suitable resistive load, except for a small amount which is fed to a high level mixer. Output from the crystal oscillator in the converter is also fed to this mixer and the sum of these two input frequencies is used to drive the final. The crystal oscillator is on 25.000 Mc., for 28 Mc. we use the sum (25 + 3.5 = 28.5) and for 21 Mc. we use the difference (25 — 3.5 = 21.5; on this band the tuneable i.f. tunes backwards).

Referring to the circuit; the receiving converter is quite conventional, and almost anything will work here. If you already have a 28 Mc. converter built up on a fairly small chassis, then that could be used by mounting it as a sub-chassis on the main chassis. This is what I have done. The i.f. would need to be correct, of course. Careful layout and shielding will pay off with the 6AK5 r.f. amplifier, as these tubes tend to be unstable. Use another type if you like, but keep the noise figure in mind. Almost any sharp cut-off miniature valve would be okay. The resistive anode load in the mixer is easy, and works well. The crystal oscillator is conventional, its h.t. feed point is about 20% up the coil from the crystal end.

People who are supposed to know, throw up their hands in horror at the idea of high-level mixers, but this one works well and is perfectly stable by reason of the low impedance of the grid circuit. I actually used a 5B/254M, but as these are probably unprocurable, I have shown an 807, although a physically smaller tube would be nicer, perhaps a 6146 or a 2E26. Similarly, the 50 ohm, 100 watt resistor used to dissipate the output of the transceiver may be hard to find; it should, of course, be more or less non-reactive.

The 6AM6 buffer-amplifier between the crystal oscillator and the mixer may be unnecessary, but is probably a wise precaution. Almost any tube of the 6AM6 type could be used.

The plate circuit of the mixer is a little unusual, it is the so called "series tuned" circuit. This was chosen so that a conveniently small value of neutralising capacity is required. The value of the mixer plate tuning capacitor should be such that when at resonance, its capacity should equal the total of the input capacity of the two final tubes plus the output capacity of the mixer. One way to do this is to short out the tuning condenser and adjust the coil so that it resonates at 0.7 of the required frequency, then remove the short and adjust the condenser to resonance at signal frequency (about 30 pF.). The neutralising capacitor is a piece of brass about 1" square, placed near the two final tubes.

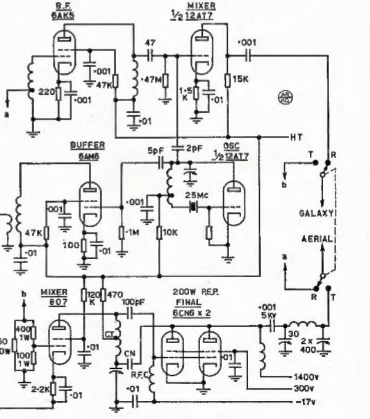
The final tubes are operating in class AB1, and are not in passive grid. They have a very short grid base and consequently stability can be a problem. Neutralising is critical and parasitic suppressors should be in the plate leads and screen leads (I forgot them in the circuit). It would be a good idea to shield the input circuit and the mixer tube should lie on its side under the chassis.

There is adequate drive for the final on 28 Mc., but this may not be so if the final used tubes with a longer grid-base (i.e. 807s or 6146s). A home-made solenoid type r.f. choke is used in the final and is quite okay.

Power supplies are left to the individual, with the thought that s.s.b. amplifiers do not need "regulated supplies," but are quite happy with "well regulated supplies". The first implies a horrible concoction of regulator tubes, reference diodes, etc., whilst the second merely means low internal resistance and no series resistance. H.t. may be left on the converter all the time and switched on to the 807 and the final during transmit. Plate voltage can be left on the final all the time and the screen switched. I use a ceramic wafer switch for the r.f. circuitry, although this does not permit push-to-talk. You could probably use a relay if you had a suitable one.

If I was to build this unit again, I would probably use a low level mixer, say a 12BY7, and then an amplifier,

(Continued on Page 15)



A TRANSVERTER FOR 21 OR 28 Mc/s

* 13 Blamey Ave., Broadview, South Aus., 5083.

PROJECT—SOLID STATE TRANSCEIVER

PART TWO

H. L. HEPBURN, VK3AFQ, and K. C. NISBET,† VK3AKK*

In this second part of the series of articles on a modulised transceiver, it is proposed to deal with the receiver "front-end" and the injection oscillator chain which is common to both receiver and transmitter.

RECEIVER FRONT-END

Reference to Fig. 1 in the November 1968 issue of "A.R." (included here for convenience of readers) shows that the front end of the receiver consists of Function 1 (receiver r.f. amplifier) and Function 2 (receiver mixer).

Fig. 5 in this article gives the circuit diagram for these functions, while Table 2 lists coil data for the usual h.f. Amateur bands.

Before proceeding with a detailed description of the circuit a general comment must be made.

One of the biggest problems involved in the design of multiband equipment, no matter whether receiver, transmitter or transceiver, is not an electrical one. In the authors' view the problem is mechanical—the physical layout of components associated with the conventional multi-wafer band switch. If, say, a four-band device is required, it is necessary **right at the start of building** to make provision for the correct number of switch wafers, coil forms, etc., to be in the right position to give minimum lead length. In all probability too, it is necessary to fit metal screens between the various sections. If, later, you want to add a band you are stuck with the original layout and metalwork and can only achieve your objective by recourse to extensive surgery.

In attempting—as this series of articles does—to present a completely flexible design—the need rigidly to fix the physical layout beforehand could not be tolerated. To a very large degree the problem has been overcome by eliminating the need for a complex switch.

The band switch for the whole receiver has been reduced to a single bank selecting the appropriate antenna coil coupling link (L1, Fig. 5) and the 10v. feed rail to each front-end board. This switch bank is physically removed from the boards and connected thereto by co-ax. The outputs of all boards are connected in parallel and are not switched at all.

To eliminate completely any slight puzzlement that may have been caused by reference to front-end boards in the plural, let it be emphasised that there is one complete set of semiconductors and coils for each band covered.

Whilst it is admitted that the approach used is slightly more expensive than the conventional one, it is the only one, in the writers' view, that could be used if the completely flexible modular principle was to be upheld.

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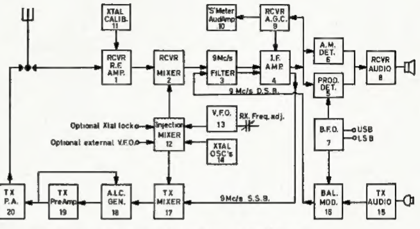


FIG. 1. - TRANSISTOR - 4 BAND - TRANSCEIVER - BLOCK DIAGRAM.

Band	L1 Input Link	L2, 3, 4, 5 RF/Mixer Tuned Circuits	L7, L8 Oscillator Input Filters	C1, C2 C3, C4 pF.	C5, C6 pF.	C7 pF.	R* RF Source Resistor
160	10t., 39g.	80t., 39g.	38t., 28g.	470	47	470	Nil
80	10t., 39g.	50t., 39g.	30t., 28g.	150	47	470	Nil
40	7t., 28g.	34t., 28g.	25t., 28g.	150	47	470	Nil
20	7t., 28g.	34t., 28g.	34t., 28g.	33	100	1000	Nil
15	5t., 28g.	20t., 28g.	20t., 28g.	33	47	470	10.0K
10	5t., 24g.	16t., 24g.	25t., 28g.	33	22	220	3.9K

TABLE 2.—RECEIVER FRONT-END COIL DATA

Notes on Table 2 and Figure 5:—

1. L6 is 38 turns of 28 gauge B. & S.
2. All coils close wound on Neosid Type 722/1 bakelite coil formers.
3. All coils use Neosid F29 tuning slugs.
4. L2/3, L4/5, and L7/8 are mounted 15/32 inch apart to form band pass coupled pairs.
5. L1, the antenna coupling link is close wound over the earthy end of L2.
6. All coils are wound with specified gauge of B. & S.

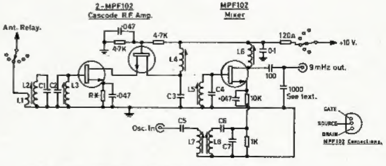


FIG. 5. - 4 BAND TRANSISTOR TRANSCEIVER - RX FRONT END.

Each front-end printed circuit board is "wired" for two bands so that the four bander as designed uses two p.c.b's. It is possible to extend the coverage of the unit up to eight bands if desired simply by adding further boards. No mechanical alterations are needed.

The circuitry for each band is shown in Fig. 5.

A fixed tuned, mutually coupled, pair of coils (L2/L3) feeds the gate of the "bottom" half of a cascode r.f. amplifier using Motorola MPF102 single gate FETs. The source resistor marked * on the diagram has the primary purpose of keeping the gain constant from band to band. For 160/80/40/20 metres, it is not needed at all.

The gate of the "top" half of the cascode is maintained at half rail potential by the two 4.7K resistors and earthed for r.f. by the 0.047 uF. capacitor.

The r.f. drain coil (L4) is mutually coupled to the mixer gate coil (L5) and proper adjustment of these and the r.f. amplifier coils enables the correct band pass to be achieved.

C5/L7 forms a series tuned circuit on the required injection frequency which is mutually coupled to L8. This latter coil is parallel tuned by the combination of C6 and C7 in series. The low impedance output required by the source method of injection into the mixer is obtained from the junction of C6 and C7.

The reason for the inclusion of L7/L8 is to ensure a pure injection waveform. This is covered more thoroughly in the section following.

The mixer proper is a third MPF102 with a 9 Mc. tuned circuit in the drain. This coil (L6) is tuned by the series combination of the 100 pF. and 1,000 pF. capacitors. Output at low impedance is taken from the junction of the two capacitors. Note that the 1,000 pF. is only needed on the first board made.

Since all board outputs are in parallel, this single 1,000 pF. will effectively be in series with the 100 pF. capacitors on the individual boards. It is of course necessary to re-peak the various L6s when adding more bands because there is some slight interaction between them.

A.g.c. is applied by varying the d.c. applied to the h.t. rail. The method of deriving a supply voltage which varies inversely with signal will be discussed in a later article. Provision is also made for a manual r.f. gain control by the same method of varying the h.t. rail.

INJECTION OSCILLATOR CHAIN

The three component parts of the oscillator chain are the functions marked 12, 13 and 14 in Fig. 1. They are detailed in this article in Figs. 6, 7 and 8 with the coil data being given by Tables 3, 4 and 5 respectively.

In general, the higher the operating frequency of the v.f.o., the simpler it is to prevent spurious responses. However, there are some obvious difficulties in constructing a really stable v.f.o. at frequencies in the 40-50 Mc. region and, after considerable experiment, the method adopted has been to operate the v.f.o. on 10-10.5 Mc., hetrodyne this with a fixed crystal oscillator to 56-56.5 Mc. and then hetrodyne down to the required injection frequency with a series of high frequency crystal oscillators.

With a fixed i.f. of 9 Mc. the injection frequencies needed for the various Amateur bands (and the hetrodyne crystal frequencies needed to come down from 56-56.5 Mc.) are given in Table 6. Note that in all cases the b.f.o. operates on the u.s.b. crystal and that the correct sideband for the band in use is automatically selected if the specified hetrodyne crystals are used. The "other" sideband is available by using the l.s.b. crystal in the b.f.o.

Note, too, that since the same injection frequency is used for both transmit and receive, there can be no offset. If the receiver is tuned to a signal on any band the transmitter comes up on exactly the same frequency and sideband. In many cases, such as participation in round tables, this may be a disadvantage and provision is made for a received frequency offset facility. This will be described later in the series.

The **apparent** complexity of the injection train needs comment. However, closer scrutiny will show that there are only a couple of additional stages over the complement of stages normally found in a transceiver. The v.f.o. and crystal hetrodyning stages and their associated mixers are common to all current designs. The one vital addition is the 46 Mc. oscillator and its mixer in the v.f.o. generator. This takes the virtual output of the v.f.o. up to 56-56.5 Mc. The reason for this can be summed up in one word . . . "birdies".

Rather than plough through the mathematics involved, a description of a practical test may be simpler.

The writers carried out a series of tests on four popular commercial sideband rigs and one very good "home brew" job. The test was simple and was as follows:

The receiver under test was set to 14.2 Mc. and a signal of 10 mV. fed to the antenna terminal. Note that 10 mV. is (roughly) equal to a "S9 + 40 db." signal. The equivalence may not be exact, but is quoted to indicate that 10 mV. is a large, but not unlikely, signal.

The signal generator was then swept over the range 8-25 Mc. (keeping the 10 mV. input constant) and the number of audible beats counted. There is nothing magical about the range chosen—it just happened to be the range with 14 Mc. approximately in the middle.

On all the units tested there were between 10 and 18 spurious responses in the receiver of strengths varying between less than S1 up to S6.

Each one of these spots represented a frequency, which, if occupied by a powerful signal, would give an unwanted "stranger" in the 14 Mc. Amateur band. (Are you absolutely certain that strong teletype signal really is on 20 metres)

In general the possibility of spots can be traced to the use of low frequency hetrodyning techniques and the difficulty, at lower frequencies, of removing harmonics from the injection chain.

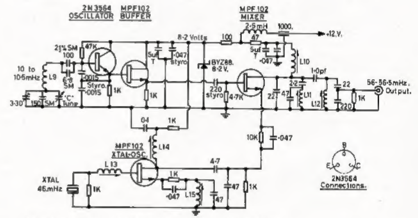


FIG. 6.-4 BAND TRANSISTOR TRANSCEIVER - VFO GENERATOR.

Coil	Freq. Mc.	Turns	Wire Gauge B. & S.
L9	10-10.5	22	20 approx.
L10	56-56.5	12	20
L11	46 (trap)	12	20
L12	56-56.5	12	20
L13	—	10	28
L14	46	20	28
L15	30-32 approx.	15	28

TABLE 3.—VFO GENERATOR COIL DATA

Notes on Table 3 and Figure 6:—

1. All coils close wound on Neosid Type 722/1 bakelite formers.
2. L9 is ¾" diameter, 16 turns per inch, "Willis" air wound inductance No. 3-16 (or B. & W. No. 3011), obtainable from William Willis and Co. Pty. Ltd., 430 Elizabeth St., Melbourne.
3. The tuning condenser C_{TUNE} is an Eddystone No. 585 4.5 to 91 pF. single section variable.

In this design nearly all the mixing is done at frequencies in excess of 40 Mc. and considerable attention has been paid to the filtering of the injection signal to ensure waveform purity.

Perhaps the real worth of the technique is best demonstrated by mentioning that when the test outlined above was applied to this receiver no spurious responses were detected at all.

VFO GENERATOR

The circuit diagram is given in Fig. 6 with the associated coil data set out in Table 3.

A 2N3564 bipolar transistor is used in a series tuned Clapp type circuit and covers 9.95-10.60 Mc., i.e. the usual 500 Kc. plus a bit of overlap. The reason for the extra 100 Kc. at the h.f. end will be detailed later. Output from the oscillator is taken from the emitter via a MPF102 source follower to the gate of a second MPF102 mixer. The h.t. to the oscillator and buffer is regulated by an 8.2 volt zener diode.

A third MPF102 acts as an overtone crystal oscillator at 46.0 Mc. The drain coil L14 is tuned by a series combination of 4.7 and 47 pF. capacitors with a low impedance output being taken from the junction of the two capacitors into the source of the MPF102 v.f.o. mixer.

The mixer drain coil L10 is tuned to 56-56.5 Mc. while L11 is a trap set to 46 Mc. to remove any oscillator voltage present. L12 is a second 56 Mc. parallel tuned circuit and uses 22 pF. and 220 pF. capacitors in series to give the low impedance output necessary for the hetrodyne mixer section.

The whole generator is contained in a die cast metal box for mechanical and thermal stability. H.t. voltage is fed into the box via a 1,000 pF. feed through capacitor.

THE HETRODYNE OSCILLATORS

The circuit diagram is given in Fig. 7 with associated coil and crystal data for all bands being set out in Table 4. Only one crystal oscillator is shown, but there is one required for each band. All outputs are paralleled and switching is by application of h.t. to the board required. Once again this technique has been adopted to simplify band switching and to avoid mechanical alterations when adding bands.

One circuit board is used and is "wired" for four bands. Simple mounting of additional components is all that is required to extend to other bands.

The four oscillators on their common board are again contained in a die cast box which is mounted on the chassis directly behind the v.f.o. box. If required another four oscillators can be accommodated in a second die cast box bolted to the lid of the first.

The output frequency of each oscillator may be varied slightly by means of L19 to ensure precise band edge alignment and thus a common dial calibration for all bands.

The drain coil (L20) is tuned by the series combination of the 8.2 pF. capacitor shown in Fig. 7 and the 100 pF. capacitor in the source circuit of the 3N140 injection mixer of Fig. 8.

All outputs are connected in parallel so that, as in the case of the r.f. stages, only one 100 pF. capacitor is needed.

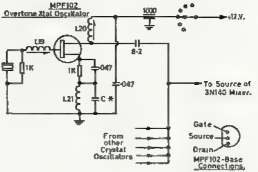


FIG. 7.- 4 BAND TRANSISTOR TRANSCEIVER - HETRODYNE OSCILLATOR.

Band	L19 Series Coil	L20 Drain Coil	C* pF.	Xtal Freq. Mc.
160	10t., 28g.	11t., 28g.	47	45.20
80	10t., 28g.	11t., 28g.	47	43.50
40	10t., 28g.	11t., 28g.	47	40.00
20	9t., 28g.	11t., 28g.	100	51.00
15	10t., 28g.	11t., 28g.	100	44.00
10	15t., 28g.	20t., 28g.	100	36.00

TABLE 4.—HETRODYNE OSC. COIL DATA

Notes on Table 4 and Figure 7:—

1. L21, the source coil, is the same for all bands and consists of 20 turns of 28 B. & S. close wound on a 330K ½ watt Ducon resistor (0.125" diam. x 0.375" long).
2. Coils L19 and L20 are close wound on Neosid Type 722/1 bakelite coil formers.
3. All coils are wound with specified gauge of B. & S.

INJECTION MIXER

A 2N3564 bipolar transistor amplifies the v.f.o. generator output to the level required for the 3N140 dual gate FET mixer. L16, together with the capacitive divider formed by the 22 and 220 pF. capacitors, resonates at 56.25 Mc. The collector coil L22 is parallel tuned by a 22 pF. capacitor and is top coupled by a 2.2 pF. capacitor to L17, also resonant on 56.25 Mc. L18 is a series tuned trap to remove any last vestige of 46.0 Mc. component that might escape from the v.f.o. box.

Excitation from the crystal hetrodyne oscillators is applied to the source of the 3N140 mixer. Gate 2 of the mixer is biased by the 10.0 and 3.9K resistors across the supply rails.

The drain circuit of the 3N140 has an untuned 2.5 mH. RFC as its load and an MPF102 source follower is used to provide a low output impedance.

The whole mixer chain is contined in a small diecast box which is bolted to the top of the v.f.o. generator box.

(Continued on Page 14)

Coil	Freq. Mc.	Turns	Wire Gauge B. & S.
L16	56-56.5	12 (tap 3)	20
L17	56-56.5	12	20
L18	46 (trap)	15	20
L22	56-56.5	12	20

TABLE 5.—INJECTION MIXER COIL DATA

Notes on Table 5 and Figure 8:—

1. All coils close wound on Neosid Type 722/1 bakelite formers.
2. The RFC in the 12 volt supply line to the VFO amplifier consists of 30 turns of 28 B. & S. wire on a 1 watt 100K resistor.

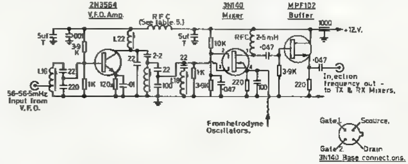


FIG. 8.- 4 BAND TRANSISTOR TRANSCEIVER - INJECTION MIXER.

ROSS HULL MEMORIAL VHF/UHF CONTEST, 1968-9

The Federal Contest Committee of the Wireless Institute of Australia invites all Australian and Overseas Amateurs and Short Wave Listeners to participate in this annual Contest which is held to perpetuate the memory of Ross Hull whose interest in v.h.f./u.h.f. did much to advance the art.

A Perpetual Trophy is awarded annually for competition between members of the W.I.A. in Australia and its Territories, inscribed with the name and life work of the man whom it honours. The name of the winning member of the W.I.A. each year is also inscribed on the Trophy. In addition, this member will receive a suitably inscribed certificate.

OBJECTS

Australian Amateurs will endeavour to contact as many other Amateurs in Australia and Overseas under the following conditions.

DATE OF CONTEST

From 0001 hours E.A.S.T., 7th December, 1968, to 2359 hours E.A.S.T., 12th January, 1969.

DURATION

Any seven calendar days within the dates mentioned above, not necessarily consecutive. These periods are to be at the operator's convenience. A calendar day is from 0001 hours E.A.T. to 2359 hours E.A.T.

RULES

1. There are two divisions, one of 48 hours duration, and one for seven days. In the seven-day division, there are three sections:—
   (a) Transmitting, Open.
   (b) Transmitting, Phone.
   (c) Receiving, Open.

2. All Australian and Overseas Amateurs may enter for the Contest whether their stations are fixed, portable or mobile.

3. All Amateur v.h.f./u.h.f. bands may be used, but no cross-band operating is permitted. Operators are cautioned against operating transmitting equipment on more than one frequency at a time, particularly when passing cyphers. Cross-band operation to assist contest working is prohibited.

Such operation will be grounds for disqualification. Cross mode contacts will be permitted.

4. Amateurs may enter for any of the transmitting sections. The seven-day winner is not eligible for the 48-hour award.

5. Only one contact per band per station is allowed each calendar day.

6. Only one licensed Amateur is permitted to operate any one station under the owner's call sign. Should two or more operate any particular station, each will be considered a contestant and must submit a separate log under his own call sign.

7. Entrants must operate within the terms of their licences.

8. **Cyphers**: Before points may be claimed for a contact, serial numbers must be exchanged. The serial numbers of five or six figures will be made up of the RS (telephony) or RST (c.w.) report plus three figures, commencing in the range 001 to 999, for the first contact, and will then increase in value by one for each successive contact. When a contestant reaches 999 he will then commence again with 001.

9. **Entries must** be set out as shown in the example, using only one side of the paper. Entries must be post-marked not later than 10th February, 1969, and clearly marked "Ross Hull Contest" and addressed to Federal Contest Manager, Box N1002, G.P.O., Perth, W.A., 6001.

10. **Scoring** for all sections will be based on the attached table. Distances must be shown in the log entry as shown in the example. Failure to make this entry will invalidate the particular claim. Some typical distances are given in the attached table.

11. **Logs**: All logs shall be set out as in the example and in addition will carry a summary sheet showing the following information:

Name ....Call Sign
Address ....Division
...............Claimed Score
Operating Dates ....(7 cal. days)
Highest Score over a 48-hour period was ....points.
Operating period:
from hrs. E.A.T. ....../....../6
to hrs. E.A.T. ..../.../6

Declaration: I hereby certify that I have operated in accordance with the conditions of my licence and abided by the Rules of the Contest.

Signed ....
Date...

12. Entrants not abiding by the Rules of this Contest will be disqualified.

13. The ruling of the Federal Contest Committee of the W.I.A. will be final. No dispute will be entered into.

14. **Awards**: Certificates will be awarded to the winners of each section in each VK and Overseas Call Area. The VK contestant who returns the highest score in the transmitting section and who is a financial member of the W.I.A., will have his name inscribed on the Trophy which will be held by his Division for the prescribed period. A Certificate will be awarded to the contestant who shall not be the Trophy winner, and who returns the highest scoring log covering a period of any 48 consecutive hours.

Also, Certificates will be awarded for operating in the Ross Hull Contest and breaking any Australian v.h.f./u.h.f. distance record.

RECEIVING SECTION

1. Short Wave Listeners in Australia and Overseas may enter for the Contest, but no transmitting station may enter.

2. Contest times and logging of stations on each band are as for the transmitting sections, however there is no 48 hour sub-section.

3. To count for points, logs will take the same form as for transmitting sections, but will omit the serial number received. Logs must show the call sign of the station heard (not the station worked), the serial number sent by it, and the call sign of the station being worked.

Scoring will be on the same basis as for transmitting stations, i.e. on the distance between the Listener's station and the station heard. See the examples given. It is not sufficient to log a station calling CQ.

4. A station heard may be logged only once per calendar day on each band for scoring purposes.

5. **Awards**: Certificates will be awarded to the highest scorer in VK and Overseas countries.

SCORING TABLE

Distance in Miles	52 Mc.	144 Mc.	432 Mc.	576 Mc.	Higher
Up to 25 Miles	1	1	2	2	20
26 to 50 „	1	1	10	10	50
51 to 100 „	2	5	25	30	100
101 to 200 „	5	10	50	60	200
201 to 300 „	15	15	75	85	250
301 to 500 „	10	20	100	125	300
501 to 1050 „	5	25	200	200	350
1051 to 1500 „	10	50	250	250	400
1501 to 2500 „	20	100	300	300	450
2501 to 3500 „	35	200	400	400	500
3501 to 5000 „	50	300	450	450	550
5001 and over	100	400	500	500	600

EXAMPLE OF TRANSMITTING LOG (Brisbane Station)

Date/Time E.A.S.T.	Band Mc.	Emission Power	Call Sign	RST/No. Sent	RST/No. Rcvd.	Dist. Miles	Points Claim.
24th Dec. 0100 E.A.S.T.	52	A3(a)	VK7ZAI	59001	59004	1110	10
0110 E.A.S.T.	52	A3(a)	VK4NG	58002	57051	330	10
0230 E.A.S.T.	144	A3	VK5ZK	56003	55043	990	25
0235 E.A.S.T.	144	A3	VK3ZJO	45004	46021	850	25

EXAMPLE OF RECEIVING LOG (Perth S.w.l.)

Date/Time E.A.S.T.	Band Mc.	Call Heard	RST/No. Sent	Station Called	Dist. Miles	Points Claimed
2nd Jan. 1000 E.A.S.T.	52	VK5ZDX	59221	VK8KK	1330	10
1025 E.A.S.T.	52	VK2ZCF	58185	VK5ZAA	2040	20
1110 E.A.S.T.	432	VK6ZDS/6	57061	VK6LK/6	60	25
3rd Jan. 0500 E.A.S.T.	144	VK5ZHJ	44102	VK5ZCN	1330	50

S.S.B. Transmitter—An Amateur Engineering Project

PART THREE

H. F. RUCKERT,* VK2AOU

SECOND MIXER AND CRYSTAL OSCILLATOR

The second mixer is basically identical to the first one. One can use a balanced mixer with a twin triode, and different valves and a variety of operating conditions were tried, or a mixer valve like the 6AJ8, etc., with screen grid shielding to prevent the oscillator signal appearing at the plate may be tried as the writer did.

The following problem occurred: The linear p.a. was on a separate chassis and no tuned grid circuit was provided. The driver tank employed caused, on 10 metres, a substantial downward drive voltage transformation, due to the ratio of driver plate capacity to p.a. grid capacity. Changing the L-C ratio at the driver plate circuit did not help much due to mismatch.

The 12BY7 driver used at the time was already working in class AB1 and could not take a higher grid input voltage (or grid current would occur, causing flat-topping) to obtain more drive on 10 metres. The gain, using a 6BA6 pre-amplifier with wide band damped tuned circuits, was only about 4, and the second mixer 6AJ8 gain was 1.5 to 2 with a similar tuned circuit. This mixer could not be driven harder without causing distortion here or in the first mixer. A further difficulty was encountered due to the crystal oscillator being remote in the nearby standing receiver, operating at the 1-2 volt level required for the receiver 6U8 mixer valve. Less than 1v. r.f. was left at the end of 18 inches of co-axial cable at the transmitter second mixer.

The mixer input signal should be no higher than 10% of the oscillator voltage, which means that under these conditions the placement of stages made it impossible to obtain sufficient drive for 15 metres and the two 10 metre ranges. At this stage one can either scrap the design, pull everything to pieces and start with a new chassis again—if one feels like it—or solutions have to be found which can easily be incorporated. There was no space for additional valves and tuned circuits with band switches.

It was found that a ferrite balun transformer with 4 x 8 turns (the type used as t.v. ½" x ½" aerial balun) gave a voltage gain of 4 over the required range from 8 to 33 Mc. and matched the 300 ohm co-axial cable between receiver and transmitter mixer. This balun was a most efficient wide band amplifier.

The second mixer was slightly modified to suit the available 8-10v. oscillator voltage, making it possible to use 1v. s.s.b. input signal. The output of 2v. s.s.b. signal was twice that delivered by the 6AJ8 mixer. It would have been a great help if the published equipment descriptions had shown the d.c. and r.f. voltages and d.c. currents.

The crystal oscillator circuit is usually used with overtone crystals like those here employed for the 15 and 10 metre operation (25.45, 32.45 and 32.95 Mc.), but works just as well on the fundamental frequency of the other crystals. Band switching is so very much easier than with the circuit recommended by the crystal manufacturer. A 6AM6 triode connected is employed in the oscillator. A 6AK5 pentode connected buffer stage is used, which gave more output than a cathode follower which was also tried. This was a matching problem. The grids of cathode followers must not be driven into grid current, as sometimes insufficient voltage is obtained also due to unity gain of these stages. Next time the c.o. will be placed close to the second mixer.

Trying to use surplus crystals which were etched or lapped to the frequencies required was only a disappointing experience. With these the receiver had many more spurious beat notes than those precalculated, and the output was too low on overtones or harmonics. The new locally manufactured crystals were perfect in every respect. They were the only expensive item the writer had to buy to build this transmitter. The 10 pF. and 7 pF. series capacitors pull these crystals to the required frequency.

PRE-AMPLIFIER AND DRIVER

To be able to step up the drive power the 6BA6 pre-amplifier was replaced by a 12BY7, and the 12BY7 driver was replaced by a 6BQ5 pentode. These valves with their higher plate current operating in class AB1 match better the damped wideband tuned circuits. Plenty of clean drive is now available on all bands.

Using valves with relatively high grid 1 to plate capacity may call for neutralising. In this case, good shielding between stages, a small earthed plate between grid and plate valve pins, stray field preventing Q2 ferrite slugs in the coils (not in driver plate coils), grid stopper resistors, ferrite stopper rings at grid 1 and plate of the driver, the driver loading by the final space charge capacity effect, and the anyhow necessary damping resistors parallel to tuned circuits kept things under control without neutralisation.

With the different L-C ratio of the tuned circuit and damping resistors, these two stages are able to deliver uniform drive power at 55v. r.m.s. to the final at all operating frequencies between 3.5 and 29.0 Mc. Minor deficiencies can be compensated with the drive control (5K ohm) in the cathode of the 12BY7 (ratio 1:3 at the most). The pre-amplifier tuned circuits are tuned to a frequency 10% higher than the lower band edge, and the second mixer plate tuned circuits are set to a frequency 10% below the upper band edge. Under these conditions the 12BY7 has a gain of up to six and the 6BQ5 achieves a gain of six at 10 metres and 20 at 80 metres after pi filter transformation (measured at the grid of the final) with the driver plate circuit tuned to the exact working frequency.

LINEAR POWER AMPLIFIER

This transmitter occupies a quarter of the volume the a.m. rig it replaces, and the weight is also down to 30%. On the other hand, there were no plans to build a minibox without leaving air space inside to fit in the glove box of the car. It should be possible to run the final at full legal power all day and not just for 30 seconds as recommended by some transceiver manufacturers (tune-up condition) to prevent the glass of the final valves from softening. Using a 200w. capability exciter followed by a 400w. linear does not appear very economical either. The final valves were to be operated close to the manufacturer's class AB1 specifications.

There were still the 25 years old but very modern looking all glass Telefunken radar valves, Type LS50, in my collection. Their size is similar to a 6146 but plate dissipation is 40w., which is ideal for the experiments intended to carry out. Their plate current was only half that of the 6146, but by using three valves in parallel with slightly higher screen and plate voltage the legal power max. of 400w. p.e.p. output with double tone input and zero grid current could be obtained with 55v. r.m.s. as drive potential.

The total valve capacities were similar to 1 or 2 more modern valves:

For three valves in parallel—
- Input C: 45 pF.
- Output C: 30 pF.
- Grid-Plate C: <0.27 pF.
- gm: 12 mA./V.

The valves require little filament power, being 12.6v. x 3 x 0.75a.

There is not much wrong with certain older valves, and I am grateful to DL1FK for a few more valves of the same type.

Also the three valve holders of the linear p.a. are mounted above the chassis. Their connecting pins (except grid 1 and plate) are soldered to tubular 1,000 pF. feed-through capacitors. 0.01 μF. disc (marked) capacitor are soldered parallel to the 1,000 pF. capacitors —just in case. A shielding strip runs across the valve holder and through a slot between grid 1 and plate pin. ¼" wide sheet copper strips have been used to wire r.f. carrying components.

At first no v.h.f. plate suppressors were used when the transmitter worked only on 80, 40 and 20 metres. Some instability was observed on 15 metres, and something had to be done before 10 metres could be used. The usual 50 and 100 ohm resistors with a few turns of wire wound around the resistor as a choke were working fine on 20 and 15 metres, but on 10 metres these resistors went up in smoke. It was found that more than two turns caused such

a r.f. voltage at the 50 ohm 1 watt resistors that they were overloaded.

Finally two turns of ¼" wide silver plated copper bands were wound around the 1 watt 50 ohm carbon resistors. This method had the desired effect without reducing the output on 28-29 Mc. Q1 ferrite rings were used before; they were effective as suppressors, but caused a loss of power above 21 Mc.

R.f. power measurements with a 52 ohm dummy load (resistor in oil filled container) and r.f. amp. meter showed that the output at 21 Mc. and especially at 28 to 29 Mc. fell off too much compared with the performance at 3.6, 7.1 and 14.2 Mc. A few calculations (A.R.R.L. Handbook) made it clear that the total pi filter input capacity at 28 Mc. should be 40 pF. for the plate load of 1,500 to 2,000 ohms and a loaded circuit Q of 12.

The output capacity of the three valves, the substantial stray capacity from the band-shaped leads and other connected components, and the tuning capacity of the variable air capacitor had each about 30 to 35 pF. This means that on 10 metres the C was two to three times too large and the resulting L was just as much too small. The L/C ratio was four to nine times too low.

With nearly half the L distributed as leads between components and switches the tuned circuit had radiating losses, and it presented a mismatch for the valve (generator). Series tuned tanks are used at 2 metres and a similar technique is employed in recent transmitters where up to 10 t.v. line output valves are operated in parallel (mobile kw. tx, etc.). Between the hot end of the pi input capacitor and the high voltage end of the pi coil is, at 21 Mc., a 95 pF. and at 28 Mc. a 55 pF. capacitor series connected to bring the total effective C (parallel to the pi coil) to about 62 pF. at 21 Mc. and to about 40 pF. at 28 Mc. The correct L can now be used and the L/C ratio and circuit Q now reach the right values.

10 pF. and half a 10 metre coil turn more or less make quite a difference to the matching and r.f. output, the drive requirements and grid current starting point. As long as coils get hot (taps may even unsolder) and the valve plates turn red, one can be sure that a mismatch caused it. The extra series tank capacitor and the input variable capacitor may both be a ganged variable unit. The series capacitor needs in this case a 30 to 40 pF. fixed capacitor in parallel. These capacitors must be able to take the very substantial circulating current at 29 Mc. and about half the r.f. plate voltage. I used fixed ceramic 1.5" diameter 10 kVA. NPO transmitter capacitors.

In order to increase the lumped L of the 10 and 15 metre coil, the lead inductance of the whole circuit had to be reduced. This is not easy with large components, the many switches and a certain front panel layout. It was achieved by using ¼" to ½" copper band instead of round wires. Furthermore, the two 4" to 5" long leads from the switches to the two air capacitors (106 pF. and 450 pF.) were made of two parallel running copper bands which were only connected at the ends.

All these measures allowed to use 5 turns instead of only 3 turns for the 10 metre coil, which doubled the L value, solved the matching problem, 28-29 Mc. tuning, L/C ratio and Q. The r.f. output was markedly increased at 21 Mc. and especially at 28-29 Mc., reducing at the same time the dissipated plate power. The tuning range becomes too narrow and the power output drops again if the series capacitor is made too small.

At an earlier stage, two H1 ferrite rings were placed over the common grid lead of the p.a. valves. This step was later found to be unnecessary and quite wrong, because they prevented 80% of the 10 metre drive voltage from reaching the final stage, like a good low pass filter.

The usual neutralising via a partly by-passed lower end of the p.a. grid (or driver plate) tuned circuit could not be used in this case. R.f. with opposing phase is also available at the output end of the pi coil of the final tank. So a series connected 3 pF. and 3-30 pF. trimmer capacitor provides an effective neutralising loop, which was only necessary on 20, 15 and 10 metres.

To adjust the neutralisation, the transmitter was warmed up and tuned up on an aerial with less than 1:1.5 s.w.r. Next, plate and screen voltage was turned off. The remaining r.f. voltage at the plate tuned circuit is measured with a r.f. probe v.t.v.m. with drive applied as before. The trimmer is adjusted until a minimum below 1v. is found. Detuning of the tank to an off resonance position or the use of an aerial with 1:3 s.w.r. will upset the balance, but with reasonable correct tuning, tank loading and low s.w.r., complete stability is assured.

Difficulties were earlier experienced when the transmitter was tuned up with an improvised dummy load consisting of two 200w. light globes. Even these two globes had in parallel 150 ohm impedance when running cool. Adjusting the transmitter and neutralisation with the unstable dummy loads (impedance depends on heat caused by the power applied) proved misleading and wrong. Depending on the accuracy of the driver tank tuning, regeneration occurred at modulation peaks after an aerial with low s.w.r. had been connected. This condition was also reported as audio distortion. No difficulties are observed with a 52 ohm Heath Cantenna dummy load. This matching sensitivity of this form of neutralisation was also the reason why the multiband tank universal aerial coupler originally installed was later abandoned.

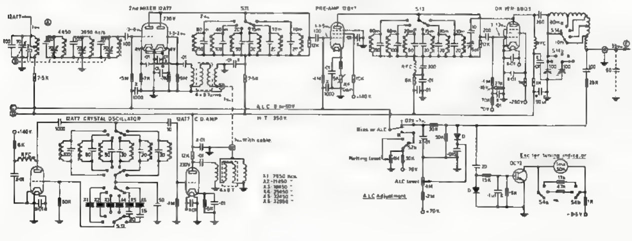
The final pi tank uses 1½" diameter ceramic transmitter capacitors of 75 pF. and 270 pF. at the high r.f. voltage input end, and medium heavy mica transmitter capacitors at the output end to extend the values of the variable air capacitors.

S.W.R. METER

The s.w.r. meter is actually a double r.f. watt meter which reads practically frequency independent, and it can be adjusted for different load impedances, features few popular s.w.r. indicators have. It is important to note that the shielding braid of the co-axial cable going through the Q2 ferrite ring is only earthed at one end.

Adjustment: The output is connected to a true 52 or 75 ohm resistor capable of handling about 20 watts or more. With some power applied, one has to see which trimmer allows to adjust zero meter reading. The co-axial s.w.r. meter[7] connections are now reversed

[7] DL6QI, "DL-QTC," February 1965.



and the other trimmer is set to obtain zero reading. The resistance of the meter movement including shunts and dropping resistors represent the diode load and determine the diode characteristic and s.w.r. reading obtained. This meter was an r.f. amp. meter with burnt out thermo-cross. The meter scale figures are, at low s.w.r. levels, nearly the right s.w.r. values, as a calibration with various load resistors showed

Forward reading four divisions, 52 ohms, 1:1 s.w.r.

Reverse Reading (Original Marking)	S.W.R.
1.6	1.5
2.25	2
2.5	2.5
2.75	3
2.9	3.5
3.15	4
3.3	5

The two Ge diodes should be matched. This s.w.r. and r.f. watt meter serves also as p.a. tuning indicator.

POWER SUPPLIES

Heavy filter chokes, large paper capacitors and the 866 rectifiers are now obsolete. The silicon diodes and high capacity electrolytic capacitors take their place.

Exciter and final p.a. have their own power supplies built in, providing also regulated negative bias and regulated lower B+ voltages. The mains switches S15 (a, b, c) and S16 (a, b, c) have four positions:

(1) Off.
(2) Filaments and negative bias on.
(3) H.t. and lower B+ on, via 1K ohm resistor to limit voltage and current peaks and to slow down the charging of the electrolytics.
(4) Shortening the 1K ohm resistor to reduce circuit resistance to improve h.t. regulation.

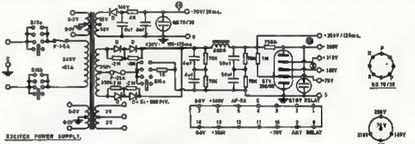
To be able to use the available 2 x 350v. transformer for the exciter supply without obtaining a too high B+ voltage, not to make dropping resistors necessary which cause extra heat, small charging electrolytics were only used. These 2 x 4 μF. capacitors must be able to stand up to the so-caused high ripple voltage and current without exploding.

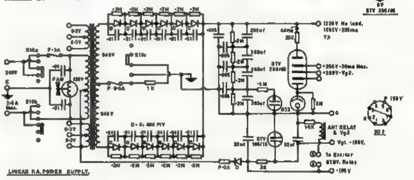
The 220v./2 x 800v. h.t. transformer has been re-impregnated after its first 20 years of service which stopped some strange noises. With 240v. input, 2 x 940v. output are obtained. No filter choke, only a string of four 260 μF. (200 μF. nominal) electrolytic capacitors are used here. It may be vital to remember that the aluminium can is usually not insulated from the electrodes of the unit, no matter whether the positive and negative terminals are both available at the insulated base plate. Insulating sleeves are placed between can and clamp. Shrunk-on plastic sleeves some capacitors have may not be sufficiently safe, they can crack if the components become too hot. A red neon pilot light indicated the charge of the electrolytic capacitors.

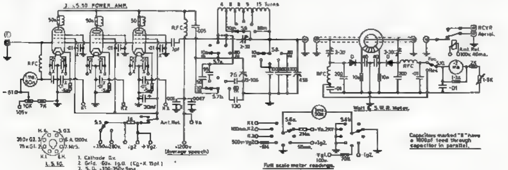
The bleeding action of the resistor chains, VR tubes and the screen current drain is quite rapid. Two screen grid voltages are available with the switch S5 from two multi-section neon stabilisers. A 30 μF. electrolytic capacitor provides the extra screen grid power for occasional loud voice and drive peaks, without having to use larger stabilisers capable of holding the voltage at >10 mA. screen grid current per p.a. valve. The h.t voltage fluctuates with speech (s.s.b. modulation) by not more than ±3%. The transmitter power is limited by the allowable heating up of the h.t. transformer, the screen grid current the LS50 valves can take, and the regulation limitations of the U_{g2} stabilisers.

A convenient source for the —80 volt bias and 100 volt/40 mA. for the antenna relay was found at the centre tap of the primary winding of the h.t. transformer. A separate 200 mA. fuse was used. At one stage an electrolytic capacitor had lost its capacity, and did not therefore act as a charging capacitor any more, and so the stabiliser for the bias voltage did not fire, causing high bias voltage of the wrong value and ripple. Strong carrier and distorted audio was reported. The large capacitors now used leave only a few mV. ripple voltage.

(To be continued)







Solid State Transceiver

(Continued from Page 9)

Band	Signal Mc.	Injection Mc.	S.B. Generated	Hetro. Xtal Mc.
160	1.8-2.3	10.8-11.3	LSB	45.20
80	3.5-4.0	12.5-13.0	LSB	43.50
40	7.0-7.5	16.0-16.5	LSB	40.00
20	14.0-14.5	5.0-5.5	USB	51.00
15	21.0-21.5	12.0-12.5	USB	44.00
10A	28.0-28.5	19.0-19.5	USB	37.00
10B	28.5-29.0	19.5-20.0	USB	36.50
10C	29.0-29.5	20.0-20.5	USB	36.00
10D	29.5-30.0	20.5-21.0	USB	35.50

TABLE 6.—FREQUENCY DATA

Notes on Table 6:—

1. In all cases the 9 Mc. sideband is generated on USB. On 160/80/40 this 9 Mc. USB is subtracted from the injection frequency to give LSB. On all other frequencies it is added to the injection frequency to give USB.

AVAILABILITY

As indicated in the previous article, kits and/or board and/or instructions will be made available at the following prices:

(1) VFO generator complete with crystal and die cast box, $35.25 each.

(2) Injection mixer complete with die cast box, $19.75 each.

(3) Hetrodyne oscillators—
  (a) 1st board, including board, die cast box and crystal, $16.50 each.
  (b) 2nd, 3rd and 4th boards, components and crystals, $9.50 each.

(4) Receiver front-ends—
  (a) 1st and 3rd bands, including boards, $9.75 each.
  (b) 2nd and 4th bands, components only, $7.75 each.

Postage on items 1, 2, 2a is 20c; on items 3b, 4a and 4b is 13c.

Please address enquiries to 4 Elizabeth Street, East Brighton, Vic., 3187.

ERRATUM

Would readers please note an error in the circuit diagram of the receiver audio section (Fig. 2, Nov. 1968 "A.R.").

A connection is shown between the collector of the AY1121 driver transistor and the 12-20 volt h.t. line

This connection should not exist and the AY1121 collector is connected only to the base of the AY1120 device.

☆

FORMER EDDYSTONE CHIEF HERE

Mr. Arthur Edwards (G6XJ), formerly managing director of Eddystone Radio (Stratton & Co. Ltd., Birmingham, U.K.), arrived in Melbourne on 4th December. An active Amateur, Mr Edwards will stay in Australia for an indefinite period and will be operating call sign VK3AMM portable.

Overseas Magazine Review

"RADIO ZS"

June 1968—

A De Luxe Mobile Power Supply; L. Uys and D. Brook. Using 2N3055s (four) to produce 650 volts at 160 mA. from 12v. battery. Efficiency about 80 per cent.

Do It With Diodes; C. de Souza. Discussion on using diodes to protect a number of electronic circuits.

July 1968—

The Ferrite Balun; J. Hugo, ZS1SC Describes a method of making a balun using straight ferrite rod ½ inch diameter Loopstick pieces about three inches long should be suitable. 1/1 and 4/1 baluns can be made with this method.

Know Your Quad, H. Randall, ZS1HF General dissertation on the origin of the Quad antenna and information on its characteristics.

Mast Erection Without Tears; T. Cust, ZS1-2C2. Describes a method of easily erecting a guyed mast using a gin pole.

August 1968—

No technical articles.

"OZ MAGAZINE"

August 1968—

Converter for 1296 Mc.; Flemming Rasmussen. Describes a transistor converter using trough lines.

Receiver with Ceramic Filter. H. Sjellerup Rasmussen. Describes a solid state receiver for the Amateur bands using ceramic filters in the i.f. stages.

"SHORT WAVE MAGAZINE"

June 1968—

Six Band C.w. Transmitter Described as "a modernised version of a standard design"—incorporating rx pre-amplifier. break-in and fully key controlled. Runs about 100w. to 6146.

V.h.f. Working by Meteor Scatter. Terminology, procedure, method, equipment and example.

Some Geloso VFO/Exciter Modifications: Some suggestions for improving the stability, h.f band drive and note of transmitters using these popular units.

Vertical Aerial Systems for the Communication Bands. Materials, methods of mounting and a co-axial dipole for ten metres.

July 1968—

Practical Two Metre SSB Transverter, Part 1. Design, circuitry, construction and alignment. 800v. on a QQV06/40.

Testing Silicon Diodes. Tells how to determine peak inverse voltage, etc.

Basic VFO for Multiband Operation. At first sight it looks a little like a Geloso. Tubes used are 6C4 and 5763. Clapp oscillator circuit is used

Station Control System: Ideas for circuit arrangement, describing a practical case.

Notes on Joystick Operation. Loading up, use of a.t.u. and s.w r indicator. This should interest some of those who have bought Joysticks.

Small Transistor Tx for Two Metres. Describes a small unit with an output of about 100 mW

September 1968—

Combined TX/PSU for Standby Operation; G8PG. Describes a small, 15w two stage single band tx and 300v 80 mA. power supply; for 1.8, 3.5 or 7 Mc.

Simplified Transverter for the Two Metre Band, G3OJV. Author describes unit be built for 2 mx from an old low band mobile and suggests how it can be adapted for 4 mx. May appeal to 2 and 6 mx men.

"RADIO COMMUNICATION"

June 1968—

2 Mx SSB Phasing Exciter Using FETs; G3MNQ discusses the theoretical approach to the problem and then gives a practical solution. This article could be of major interest to v.h.f. s.s.b. addicts.

Reflectometers and Directional Power Meters; G3NJY goes into the theory of operation of these devices complete with the mathematics. He then describes a device which differs from the usual v.s.w r meter because it is not sensitive to changes in the operating frequency.

Make Your Own Cabinets, G2UJ describes a simple method of making acceptable cabinets from readily available components with the tools which will normally be available to the average Radio Amateur

The British Trans-Arctic Expedition' G3FLB describes the preparations for and problems encountered by the party which is at present attempting to walk across the ice from Point Barrow in North America to Spitsbergen. Previous attempts have failed to recognise that the ice is in constant motion and have walked against the current as it were. The present expedition is using the current to help them on their 3,800 mile journey on "Shank's Pony"

Technical Topics In this issue Pat Hawker, G3VA discourses on transistor repair jobs, thyristor control circuits and the interference they can cause unless the equipment incorporating the thyristor is properly "suppressed" and shielded. A new type of transistor mixer, patented by CFTH-HB is described. This is covered by British Patent No. 1,104,928. Common collector configuration is used and although the circuit has practically unity gain, it is said to be very low noise and is not nearly so lossy as diodes. The circuit is said to overcome the transistor saturation problem "Another Crystal Oscillator" circuit operating in the parallel resonance mode on fundamentals between 1 and 20 Mc is used.

Pat Hawker also discusses the articles which have recently appeared regarding some of the new developments in "Compact Aerials" such as 'The Army Loop" described in "QST," March 1968.

July 1968—

A Simple Solid State Sideband Sender, W. B. Hartogg, G3JEJ. They've gone all Germanic in the title. A brief look indicates that this article contains some useful ideas for the man who wishes to "roll his own" in the face of all the opposition from the manufacturers.

A Selection of Co-axial Connectors. Mrs. K. M Priestley, G3XIW The authoress describes most of the inexpensive type co-axial connectors available on world markets and tells of the advantages and disadvantages of some of them.

Technical Topics. This month Pat Hawker talks of the advantages of Morse, simple product modulator, new monolithic filters, the latest development in the crystal filter field, "A Modern ECO", an active antenna and various types of recent v f o. circuits such as the Seiler and Vacker using FETs

The Idea Behind GB2LO. GB2LO is the station the R S G B. set up at the 1968 "City of London Festival" Sylvia Margolis discusses the concept and what is expected from the "advertising" that British Amateur Radio is receiving.

A Fresh Approach to the TVI Problem. Various ways of preventing spurious signals from being radiated are discussed and also methods for preventing "spurious Amateur signals" from being generated in various pieces of entertainment equipment.

September 1968—

Loop Aerials; G6NA. A discussion of loop aerial characteristics and their uses for transmitting and receiving.

A Simple Audio Oscillator and Pulse Generator; ZL2AMJ. Using parts of the type we can get in Australia, the author describes a sine wave oscillator with a frequency range of 15 c p.s to 150 kc output 5v. pp. sq. wave covers the same range and has a variable "mark-space" ratio.

Technical Topics, G3VA. This month Pat Hawker ranges from "Transverters to Modulated Light Communication", n b.f.m. and a.f. filters are by the way.

"DL-QTC"

September 1968—

Multiband Quad; DJ4VM A different sort of quad. The elements each consist of two triangular closed loops on each end of the boom and the whole thing is fed by tuned feeders from a matching unit. Both ends are driven. For 20, 15 and 10 metres.

"QST"

July 1968—

The M.A.B.A.L. Antenna, K1KLM, This looks like a reasonably practical version of the "Army Loop" applied to mobile. It is built of rectangular down pipe and looks like an overgrown packrack.

Digital Logic Devices; WA6KGP Symbols, nomenclature and principles.

(Continued on next page)

Integrated Circuit Frequency Divider; K9CPZ. An application to the Amateur frequency standard.

The Clipboard, W6WYD. A simple experimental circuit board.

Some Ground Rules for Sweep Tube Linear Amp. Design; W1CER. Four 6KD6s as g.g. triodes with individual bias adjustment for each tube to avoid purchasing a "swag" and matching them. 800w. input with 900 volts.

The Double Bazooka Antenna; W8TV. Broad-band dipole using co-axial construction.

August 1968—

The Connecticut Bond Box, W1CER. Doug De Maw describes a solid state transceiver for 144 Mc. Super-regen. rx and tx running about 4w. input.

A 65 Foot Crank Up, VE2AES/W6. Quite a job for those who are really good with things mechanical.

Digital Counter with Teletype Print Out; W2RBN ICs, etc., in a sophisticated piece of equipment.

The SSB Mark I., VE2IB. A simple transistor transceiver for 20 and 75 (80) metre sideband.

A Transceiver Monitor using Transistors; W4BX. For those whose transceivers do not incorporate a c.w. monitor, this could be a handy gadget. Short and simple.

September 1968—

A Transistor Phone Rig for 1.8 Mc.; W1CER. Solid state tx for the "top band". Input power is 7-8 watts.

600 to 20,000 Metres, W1IKU. A simple transistorised converter for the v.l.f.

The C-Line Matcher, W3GKP/A3GKP. Simplified impedance matching on v.h.f.

A Tester for Crystals and Transistors; W1NPG. The title describes it.

The Two Tailed Monster; W6ISQ. The recipe is to take one four element multiband quad and add tails to the boom to resonate it as a rotatable dipole on 40.

The 2T/2M, K6LZM. Running 1.2 watts a.m. a small transmitter for 2 metres.

Notes on the Vacation Special, W2YFM. Described as "a tunable filter for the BC454 and an improved 50w transistor modulator for the BC696". There are still enough of the Commands around to interest VKs.

Inductance and Q of Modified Surplus Toroidal Inductors, W3NQN. Something for the r.t.t.y. boys.

A General Purpose VFO; W1CER. Solid state, of course.

Prefabricated Portable; W6YBT and W6ASF. Describes a portable made up from various modules which are readily available on the market.

Beware the Scrap Box; K2ENU. Describes some of the traps into which Amateurs can fall if they do not have proper test equipment to test the junk box and disposal items they propose to use.

"73 MAGAZINE"

July 1968—

Let's Build a Tower; VE1TG. Sturdy wooden construction tower.

Why Not a Tilting Tower?; W6DL. With this method why not?

40 Foot Non Conducting Skyhook; K7VBQ. Making the most of a phone pole.

Burn Protection, VE3BUE. A safe place for the hot soldering iron.

The Beam Pole; W7GBJ. Another phone pole idea.

Tilt That Tower; W2AJW. Using the house for leverage.

Panel Gap Filler; Ives. Another idea to fill the holes.

IC Audio Amplifier and Oscillator; W7AKS. ICs are here to stay.

The New Tower; WA2GXT. Battling the tower inspector.

Some Audio Thoughts; W3KBM. Versatile modulator unit.

DB, WB2PAP.

More on Crystal Etching; K8GKP. Using readily available chemical.

August 1968—

Terminated Grid Linear Amplifier; W1DIS. Extremely stable configuration. Two Eimac 4-400As for 2 kW. input. A little too large for Australians.

A Unique Transistorised DC/DC Converter; WA4JVE. Converter using a conventional transformer. This article describes a converter using a c.t. step-down transformer from 117 to 12.6v. to provide 300v. d.c. from a 12v. battery. The circuit used is a multivibrator amplifier arrangement which dispenses with the conventional saturated core type transformer. This technique would probably work to provide 600v. from a 240v. type.

Photographic Printed Circuit Process; W6AYZ. Printed circuit etching made easy. Now who is interested in making their own?

A Simple Method of DSB Conversion; K5LLL. An easy way to d.s.b. using a "balun" for broad-band feed. Seems good.

Basic HF Receiving Converter; WA4UZM. Getting more from your h.f. receiver. Simple circuit using two twin triodes.

Three on 20 for 15; WA4YVQ. $15 three element beam for 20 mx. Seems practical, uses bamboos and wire elements with some lightweight wooden members.

The Mini-Boom Quad; VE6FS. Efficient quad with spider array. Some handy ideas for an inexpensive easily made quad (three-band variety).

The Collinear Resurrected; WA1DVD. End fire array without sacrificing performance. A simple wire array for 20 mx with a gain of 7.7 db.

A Microphone Preamp. Clipper; W2EEY/1. More speech power without distortion. Simple single transistor/diode affair built into a hand mike.

Review—The Heath IM-17 VTVM; W2TQK. A versatile piece of test equipment. The writer reviews the Heath battery operated solid state voltmeter.

Humwriting; K6MVH. A veteran writer tells how. An article on how to write articles for Amateur magazines.

A Grounded Grid Linear Amplifier; WA6WUI. 3 through 30 Mc. in five steps. Circuit suitable for 4E27s or 813s. Cathode driven linear for 800 watts input.

September 1968—

Going VHF in the Mobile; W9HBF. Describes how to get the most out of both v.h.f. and Mobile.

Communicator Reborn; W6HGX. Double conversion of the Gonset Communicator makes the unit more selective and useful.

432 Mc. Amplifiers, W6AJF. Although [redacted] C. Jones is an old timer, he describes solid state equipment using a FET for 432.

Quick Converters; W9NLT Describes how you can use obsolete t.v. tuners to quickly assemble Amateur band converters.

So You Think You're on Frequency; K. Sessions. Methods of checking frequency on the v.h.f. bands are discussed.

Parallel T Network Design; Jim Kyle. Seems that this is a network which is very useful.

The VK3ATN Moonbounce Rhombic; W3NSD. Wayne describes some of the tricks Ray got up to, to make two-way moonbounce contacts with the U.S.A.

6 Metre Exciter; W1KNL A handful of transistors and a 6CL6 on 6.

Six Metre Transceiver; W2AJW. Using transistor modules, junk b.c. rx and a few extras to produce a small solid state transceiver for 6.

Two Sidebands from the Two-er; W4KAE. Quick and easy d.s.b. on 2 mx.

"CQ"

July 1968—

Modulation Unlimited, Part 1; W3PHL. A two-part article which is completed in the "CQ" August issue describing methods of "super modulation", i.e. modulation which exceeds normal a.m. 100 per cent. figures on positive peaks but not on negative peaks. Covers the principles and circuit techniques necessary to exceed 100 per cent. modulation without the production of undesirable side effects such as distortion and splatter. The modified final power amplifier circuit can be used for c.w., a.m., d.s.b. and s.r.c. modes.

Vertical Antennas, Part 2; W3JM. Deals with theory and practice of this type of antenna which the author claims has never previously been covered in depth in an Amateur magazine.

The Drake Solid State VHF Equipment; W2AEF. Review of the equipment for v.h.f. offered to Amateurs by the Drake Co.

How Linear is a Linear Amplifier?, W2EEY/1. Describes the various types of distortion met with in s.s.b. operation and equipment design problems, with special accent on intermodulation distortion (i.m.d.) which is rarely specified in Amateur equipment.

Improved FM Operation; WA2UIT. Describes how proper maintenance of two-way f.m. equipment can improve the number of contacts in mobile operation.

Solid State Coupling Methods, W2YKT The whys and wherefores of coupling circuits in solid state i.f. amplifier design.

FSK With Voltage-Variable Variable Capacitors; K1EUJ. Describes a method of using v.v.c's for shifting the frequencies in f.s.k. work.

A Salute to Mr. One-Sixty; W2EQS. A rundown on Stewart S. Perry, W1BB, who has been on the air since 1912, mostly on 160 mx.

Using the Grid Dip Meter, Part 3; W2AEF. Describes how to use a g.d.o. for Amateur work.

August 1968—

The SST SERIES; K9AJ/2. A series of small "Solid State Transceivers" for 10, 6 and 2 mx. Using super-regenerative detector rx's operating at very low power levels to minimise radiation from the oscillating detector. Sensitivity is about 1 uV. This is followed by a commercial a.f. amplifier which is used also as the modulator. The transmitters run inputs of about 100 mW

The DX-pedition, D. Miller, W9WNV Part VII. of the Miller story.

The QM Keyer Monitor, WB2CQM. A simple tube type keyer with a transistorised monitor incorporated.

By Permission of Her Majesty Queen Elizabeth II.; Sylvia Margolis. The publicity officer for the R.S.G.B. describes the special station sponsored by R.S.G.B. at the 1967 National Rally of the Caravan Club of Great Britain. Station operated under the call sign GB2CC.

Modulation Unlimited, Part 2. Describes modifications made to Heathkit DX100 putting ideas into operation.

The Heathkit HW-100 Transceiver; "CQ" Review. This is Heath's low priced £240 (US) five-band unit which according to this reviewer gives a very good account of itself. After reading this story, I feel I certainly wouldn't want to spend £360 (US) for the SB101

Vertical Antennas, Part 3. Paul Lee continues his dissertation on this topic.

RF Feedback in Audio Compressors; K6SHA. Short article on elimination of r.f. feedback.

The Shoebox Symposium, W2EEY/1. This author has described two "Shoebox" linears. The first in 1965 and Mark II. in "CQ" July 1967. This article describes methods of overcoming the various problems which have been encountered by builders of a linear which can be set to run inputs of from about 800w. to 2,000w. peak d.c. according to the number of 6HF5s used in parallel. The new 6LQ6, which has a special rating of 200w. for 30 secs., should be very suitable for this circuit. This tube and its competitors equivalents is now finding its way into many of the newer transceivers which are operated at 500w. input levels. There is a mistake on the circuit shown on p. 62.

SSB Reception With Signal Frequency Injection; VE7BRK. Seems to me like a new method of doing it the hard way.

A Home-Brew Broad-Band Transmitting Balun, W2EEY/1 The balun described is made from a length of co-ax wound on a plastic tube. 50 ohm RG58 is used. Presumably the same technique could be used with 75 ohm cable to give 75 ohm balanced to 75 ohm unbalanced conversion

A Wideband RF Pre-Amplifier; W6DYD. Describes a low noise broad-band FET/transistor amp. with a gain of 25 db. up to 15 Mc. with a roll-off to 12 db. at 40 Mc. Some people may be interested in this technique My personal reaction is that one would lessen interference by using a tunable device.

Upgrading the SB-100; W6VHY. Modifying the Heath SB-100 to improve its a.v.c. system.

☆

A TRANSVERTER

(Continued from Page 8)

say another 12BY7, and then have the 6CN6s in passive grid, or semi-passive grid.

No attempt has been made to use this transverter on 21 and 28 Mc. by bandswitching, but this should be fairly easy. The same crystal oscillator and buffer amplifier circuitry would be used, and the same crystal. You would have to switch the tuned circuits in the converter, the coil in the plate of the mixer, and the final tank coil.

All tuned circuits in the converter, the oscillator and the buffer are slug tuned. No coil data are given, except that all coils other than the final grid and final plate are on 7 mm. formers. Injection to the 807 is by 3 or 4 turns over the end of the 6AM6 plate coil.

I will be glad to answer any mail queries, provided that they are accompanied by a self addressed stamped envelope, and provided that you don't expect overnight service.

Publications Committee Report

At the November meeting correspondence was received from 9M2DQ, VKs 3AQ, 3UC, 3AMK, 5BI, 5RG, 7KJ, Nola Sturke, E. Foxon, W. Morgan, and L7051. Technical articles arrived from VKs 2JR, 2SA and 3ZNV. Due to the lack of figures, the financial position of "A.R." could not be ascertained accurately, but it was estimated that the position is reasonably satisfactory.

Efforts to increase advertising content are proving fruitful, the advertising representatives having already signed up a number of new advertisers and recovered some of those lost several years back. A major effort will be made in this direction during November.

A review of technical material on hand revealed sufficient available to see us through to the February issue, and extra material, particularly short articles, are badly needed.

Progressive results of the November questionnaire were discussed and a very good initial response reported. No replies had been received from VK2, but this was thought to be due to the postal strike in N.S.W. having delayed the delivery of the November issue. Over 200 replies were received within 48 hours of "A.R." being mailed. Initial sorting has commenced, but until many more replies are received, no attempt will be made to compile statistics.

At the suggestion of the VK3 Divisional Council, the committee gave consideration to making token payments for technical articles published. After lengthy discussion, it was agreed that although the suggestion held considerable merit, and in fact conformed to the wishes of the committee as outlined nearly three years ago, it would be better held over for a minimum period of six months, in order to see what additional income (if any) we can acquire. In the meantime, we will continue to make the annual awards for selected articles, as we have done in previous years.

The value of the monthly Publications Committee Report was questioned, and the general opinion was that the time compiling it could be better spent as it has to be done during our busiest time of the month. It was, therefore, decided that despite the fact that it has been produced as the result of a Federal Convention policy motion some years ago, the report would be discontinued as from this issue. Technical articles and correspondence will be acknowledged by mail in due course, with the exception of any correspondence published in the magazine, for which no acknowledgment will be sent.

All Call Book orders have been fulfilled. Any Division or club requiring additional copies should contact us, as we have a small surplus available.

SILENT KEYS

It is with deep regret that we record the passing of the following Amateurs:

VK1PI—Les Pitts
VK2AYA—G. A. Ahlstrom
VK2AYB—Sid Burton
VK3VO—Raymond Clark

TESLA EQUIPMENT IN AUST.

The internationally famous Tesla electronic equipment is now available in Australia through Charmac Industries Pty. Ltd., Eltham, Vic.

Founded in Czechoslovakia 60 years ago, the Tesla company now employs 75,000 people in 50 factories and manufactures heavy electrical and telecommunications equipment.

Charmac Australian sales manager, Les Baker, advised "A.R." that in addition to the range of Tesla tape recorders and audio amplifiers, they would distribute Tesla components, and Agfa tape which had been found most suitable for use with Tesla recorders.

An associate company, Audio-Lec of Australia Pty. Ltd., will distribute the Italian made "Incis" audio equipment.

W.I.A. D.X.C.C.

Listed below are the highest twelve members in each section. Position in the list is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total D.X.C.C. credits given, including deleted countries. Where totals are the same, listings will be alphabetical by call sign.

Credits for new members and those whose totals have been amended are also shown.

PHONE

VK5MS	315/338	VK5AB	298/314
VK3AHO	312/335	VK4PJ	282/301
VK6RU	307/332	VK4TY	275/278
VK4HR	304/322	VK3TL	271/277
VK6MK	304/323	VK3APK	269/274
VK2JZ	303/330	VK2AAK	268/273

New Members:
Cert. No. 91 VK9WD 106/106
Cert. No. 92 VK3VK 152/152

Amendments:

VK4KS	268/283	VK4PX	175/179

C.W.

VK2QL	300/322	VK5YL	266/282
VK3AHQ	292/306	VK3ARX	266/275
VK3CX	289/312	VK6RU	256/269
VK4PJ	289/313	VK3APK	265/273
VK2AGH	282/296	VK3NC	264/277
VK4HR	276/300	VK3XB	263/277

Amendment:
VK4PX 108/108

OPEN

VK2AGH	311/331	VK4TY	301/315
VK4HR	309/333	VK4PJ	296/320
VK6RU	309/334	VK3ARX	289/298
VK6MK	305/324	VK3TL	287/293
VK2VN	304/321	VK3APK	286/296
VK2EO	302/325	VK3XB	266/274

New Member:
Cert. No. 114 VK5EU 107/107

Amendments:

VK4KS	274/293	VK4PX	200/205

World Admin. Space Radio Communications Conference

Of three resolutions published by the I.T.U., the following extract is worthy of note. Reference is made to this in Federal Comment (this issue).

". . . The second resolution, which is no less important, calls for the convening of a World Administrative Space Radio Communications Conference to take place towards the end of 1970 or the beginning of 1971 for a duration of about five weeks.

"The agenda of this conference is to include in particular the following items:

1. To revise existing administrative and technical regulations and adopt such new provisions as necessary for the space radio services and the radio-astronomy service which will ensure the efficient use of the spectrum;
2. To consider, and revise as necessary, the provisions of the Radio Regulations pertaining to the Aeronautical Mobile and the Maritime Mobile Services and to navigation in so far as the use of space techniques is concerned;
3. To consider and provide as far as possible, additional radio frequency allocations for the space radio services;
4. To revise and supplement as appropriate the existing technical criteria for frequency sharing between space and terrestrial systems and establish criteria for sharing between satellite systems.

"In the same resolution, Administrations are invited to submit proposals on the agenda of this Conference. On the basis of these proposals, which will be presented in a report by the Secretary-General, the 24th Session of the Administrative Council will decide on the agenda, date, duration and place of the World Administrative Space Radio Communications Conference."

DX

Sub-Editor: PETER NESBIT, VK3APN
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BAND NEWS

28 Mc. From Don VK3AKN comes a very comprehensive rundown of conditions on 10 mx Here goes: "At 0700 E.A.S.T the band opens to the East Coast of the U.S.A. The opening moves across the States until 1100, when W6 peaks. The Ws generally fade out at about 1200. JAs and UO0s start about 0800 and last until dark at 7 p.m. UA9 sneaks through about 1100, although I did work one once at 7 a.m. UL7/UL8, etc., start at about 1300, and UD6/UA3, etc., picks up around 1500. DM3IGY comes through about the same time.

'Western Europe (DL, LA, SM, etc.) comes through around 1800. Africans start around this time, although sometimes as early as 1600, Gs, Fs about 7 p.m. and then general QRM from all over Europe. The band usually fades at 9 p.m. or so. If it stays open until 11 p.m., as it does sometimes, then Caribbean stations come through on long path and have worked KV4CI often at this time.

'Sometimes, when aurora is in effect, can work Eur./U.S.A. stations with the beam pointing due north. The aurora bounce often causes good T9 signals to change to T3, the effect sounds quite strange."

VQ8CC who is active 15/20/40 mx as well, reported 28025 at 14z.

5T2SA 28040 at 15/22z. Has been active 14026 at 21z, also 28050 at 1237z.

TL8GL—28550 at 1930z. QSL via VE2DCY.

7Q7WW 28583 at 2010z. QSL to Box 483, Blantyre.

9L1KZ Sierre Leone 28517 at 19z.

AP2MR 28622 0943. Has gear for 80 mx. QSL via VE3ACD

9N1MM, an s.s.b. veteran of 15 and 20 mx, 28555/575 around 09/11z. QSL via W3KVQ.

SV0WN from Crete 28587 at 1030z. QSL via K3EUR.

7P8AR 28620 at 14z. QSLs via W4BRB.

21 Mc.: YA1HD 21310 at 1220z; QSL via DJ9HD. YA2HW "Peyton" (wonder if his last name is Place), 21295 at 12z.

VP2AA Antigua 21296 at 2235z. QSL via VE3ACD.

VP2DAI, DAJ, Dominica 21356/361 respectively at 2150z.

CE0AE from Easter Island 21336 at 23z.

6O1GB in the Rep. of Somali, 21400 at 1650z.

VS5TJ active from Brunei, week-ends 21300 at 18z.

AP2DI and W4UDF/AP will be active 21305 at 13z.

FB8XX Kerguelen Isl. 21075 at 0813 and 1310z.

TA3AR, "Lamar" K7SAD, QRV daily 21060 c.w. and 21355 s.s.b. 16-20z. Plans to stay there until Feb. next year QSL via WA7GQA.

LA5T Tromso Archipelago 21320 at 09z, 21310 at 12z.

LA1T Vesteralen Isl., 21326 at 0832z.

LG5LG reported on 21065 at 12z. QSL via LA4YF

EP2KB Ken is active 21355/370 at 0823/1146z respectively. QSL via W3NNX.

HS5ZZ, Chuck reported 21323 at 1310z. QSL via K3FYS.

TU2AX 21325 at 2215z. Box 4066, Abidjan.

5Z4KK on 21335 at 2305z. QSL via K1SLZ.

9K2CC 21313 at 1130z. QSL via K9CSM.

5A1TY from Libya, 21366 at 1130z.

LX1MH 21326 at 1329z. KM6CE 21292 at 03z.

5N2AAU 21283 at 21z, QSL via WA8UFV.

ZE5JU 21276 2124z

MP4MBB from Muscat and Oman. 21225 at 1200z.

CR3AD on 21095 c w at 1930z.

14 Mc.: OH0AA Aaland Isl., 14045 at 0650z.

VP8DJ Antarctica 14202 at 02z. QSL CX3AM.

VP8KD and VP8KE on Falkland Is. Both 14202 at 00z. QSLs for VP8KD via K3JXY

FO8AA 14030 at 0520z. FO8BX 14202 at 1135z.

Gibraltar ZB2A on 14085 at 22z. ZB2Y 14205 at 2213z.

Guantanamo Bay KG4AM, 14325 at 06z.

AP5HQ has been active on 14002 at 1245z.

AP2DI and W4UDF/AP both active from East Pakistan, 14050/205 12-14z.

French Guyana: FY7YM 14050 2230z, also on s.s.b. at times. QSL via VE1KG. FY7YK 14063 at 22z.

Seychelles: VQ9RF has been active 14045 at 21z. VQ9V 14198 at 13z.

ZK1AA, Stuart has been active again from Cook Isl., 14218 at 04z.

JT1AH has showed up 14028 at 15z.

CR9AH is now back as VS6AG. [redacted] active 14195 16-18z.

FB8WW has been active from Crozet Isl., [redacted]

VS5TJ, Slim is still active, 14171/310 between 11 and 12z. QSL via Box 308, Brunei.

CR5SP and CR5IV are QRV for Pacific stations, 14170 Sundays 0530-0600z.

Victor CR6LF is also QRV for Pacific stations daily 14155 at 0600-0730z.

FH8CD uses 14125. Andre skeds FB8WW and 9U5BB daily at 1530z.

TA3AR 14030 c.w and 14195 s.s.b. from 22z. Lamar expects xtals soon for operation on 14210 and 28660.

UA1KFT Novaya Zemlya, 14052 at 0745z.

F9IE/6W8 will be operating until Dec. 2 on 14 Mc at 17-18z.

HB9ET/EA0 14004 0645z; QSL to HB Bureau.

9X5MF/EA0 14182 2122z; QSL via HB9MQ. Fernando Po is rumored to be breaking away from Spanish Guinea, so it is likely to have a new prefix soon.

OX5AP (Harry, WB6MJQ), 14220 at 21-23 and 03-05z. The lost logs of June 66-July 67 have now been recovered, so anyone who missed getting a QSL during this period, please send s.a.e. plus two IRCs to H. Leggans, Box 12, R.C.A.S.-B.M.E.W.S, A.P.O., N.Y., 09023.

OX5AY Scotty 14170 1837. QSL via WA3CUO.

TF2WLC 14260 0815z, often QRV 21355 also. QSL via WA4PFD.

ZK1AA skeds KH6GLU 14270 Fridays at 0430z.

8R1J, Peter, 14075 at 0120z. P.O. Box 557, Georgetown

BV2A, Tim operates 14025, usually 12-16z, hopes to be QRV during contests. His address is Tim S. H. Chen, 6144 Hsin Sheng Road, Section 1, Taipei, Rep. of China.

HC8RS skeds WB6KRJ twice a week 14238 at 04z. QSL via SM5EAC.

5T5AD "Alban" is often active 14250 around 07/08z.

7 Mc.: DU1FH, Earl hopes to be QRV with 2 kw. and 2-el. 40 mx quad by Nov. and is trying for a D.X.C.C. on 40 mx and will be pleased to arrange skeds. Also hopes to work VK/ZL on 5 mx using an 11-el. yagi.

VU2LO has been active near the band edge 7001 with a good signal. Reported at 1225 and 18z

KR8EA with a good signal on 7020 at 1530z working JAs.

TI2PZ, Jose is back on 40 mx after a temporary absence. Reported on 7010 at 08/07z.

HI3PC is on almost every evening 7005-10 around 08-10z.

9Y4DS shows up occasionally, 7025 at 0743z. Name is Ram.

AP5HQ has been heard/worked several times recently. He stays very close to the band edge and knocks them off about one per minute. 7001 at 1230/1345z.

HM4EW 7013 at 1130z.

OM2BNZ heard calling CQ VK/ZL 7005 at 0725z (long path).

VU2JA, Joe requests QSLs via W2CTN. 7013 at 1450z.

OA4UO, Ted works 40-10 mx. 7015 at 1040z.

3.5 Mc.: ZK1AA, Stuart is QRV 3560 a.m. daily 0830z, with Harry ZK3AE.

GM3XPQ, Shetland Isl. (north of Scotland), 3795 at 22z. Presumably he would come on earlier for skeds if requested.

9V1PA worked first of all on 40 mx, then transferred to 3503 where signals were 23 both ways at 1305z.

KA2RM 3520 at 0904z.

KS6CN, who is on 80 mx now, says he hopes to be active on 160 mx very soon.

1.8 Mc.: GM3XPQ, George reported on 1876 s.s.b. at 2030z.

W0VXO is at present visiting the Carribeans and is an enthusiastic 160 mx man. So far he has been to KV4 and VP2, and plans many more good ones before he returns to the States. He usually uses 1824, but has rocks down to 1802.

Other recent DX-peditions using 160 mx have been ZF1EP and PJ0MM

Further to the subject of 160 mx trans-Pacific tests (see last month's "A.R.") there is a rider that the times given are not rigid. VK/ZL stations are advised to start around 1130z. Trans-Atlantic DX Tests are scheduled for Dec. 1, 15, 29; Jan. 12; Feb. 2, 16. Calling procedures are the same as in the trans-Pacific tests, with European stations calling during the odd five minute periods, 1905-10, 1915-20, etc.

[redacted]

S.s.b. interference from Spanish speaking stations in the c.w section of 20 mx has been increasing lately. Additionally several instances of "buzz saw" c.w. have been cutting freqs. to pieces. A.R.R.L. has a special section which would like to obtain calls, times and freqs. of such operations, so that action may be taken.

The Canadian DX-pedition which is presently doing so well for itself under numerous Pacific calls, operates 14170 and 14197 from 0945 to 1600z; 21290-300 from 2200 to 2330z; and 28530 around 23z.

9K2BV hopes to be operating from the Kuwait/Saudi Arabia Neutral Zone soon, if not already

FO8CB is a French Scientist attached to a nuclear testing station on Tuamoto Archipelago in the Pacific. 14105/115 0630/0730z.

CR8AK: s.a.e. plus five IRCs to Box 541, Hong Kong.

WC4GSC was a special station from Ogeechee Fair, Statesboro, Georgia. Special QSLs via W4DQD.

W4QVJ is not QSL manager for CE0ZI/MM, only for Ed's operation of CE0ZI Oct. 63.

Bruce VK3BM is reported to be erecting a 3-el. fixed quad on 80 mx, beaming to Europe!!! (Gulp!!)

Starting Feb 1, Gus W4BPD plans to set out on another world wide DX-pedition which may last up to five years, funds permitting, and run along lines to make the sport of DXing what it was a few years ago. Gus will operate c.w./s.s.b. 160-10 mx. All donations as soon as possible to QSL mgr W4ECI, cheques payable to World-Wide Radio Propagation Study Association.

U1A Special call sign allotted to a group of Leningrad operators for the "CQ" W.W. Test.

VK3XK states that he is not intending another trip to Lord Howe Isl.

Next Feb., W6BPO is going to Norfolk Isl. as VK2BPO/9.

VR3DY QSLs are now acceptable for DXCC credit.

Art VK4PX writes on licensing in Indonesia from information sent by YB0AR: "There is no QSL bureau in Indonesia and cards should be sent direct. There are only 18 international licensees at present using the prefix of YB. It is estimated that 1,500 others are interested in Amateur activities, but yet to be licensed. Avoid working YC and YD stations as these are not international and will not QSL. Until three months ago, there had been no legitimate Amateur activity. Any stations heard using PK prefix are pirates. The call areas are YB0 Djakarta, YB1 West Java, YB2 Central Java, YB3 East Java."

ACTIVITIES

Don VK3AKN works a special one on 10 mx every morning, and submits the following sampling of a mighty three-week effort. 28 Mc. c.w.: KH6GQB, UL7AST XW8CS (via VE8AO), YA1ZC (Box 638, Kabul), UA3AXJ, UA3GS, UI8KAD, UM8AP, ZE1AV, UA6KMY, UT5KDS, ON8RA, UW0BO, DL7AA, DJ2VK, HL9KQ, VE7BOB, 9V1OT, LZ1AG, UC2AFC, UQ2KCS, HM0B (Seoul Radio Club), G8PB, DL6NP, DL8SC, UT5GP, UV3QG, UP2MB, OM1ATX, OM1TA, UA1RF, SM5BNX, HB9DX and G3RHP who is a uni student and very keen to QSO VK on r.t.t.y. (Thanks Don, Peter)

Despite QRM from various other activities, Barry VK5BS managed to sneak in a few good ones on 14 Mc. c.w., including JH1EPS, PY-2SO, G8AI, F3AT, DJ1BJ, I1BVP, VE1ON plus numerous UAs, JAs and Ws. Best QSLs for the month: 1G5A, VR3DY, 5VZ8CM, VQ9B, TG5AA, HK4ALE. Barry has been listening around 160 mx; says conditions very poor, no signs of ZLs or other DX, but heard some Japanese shore to shore stations around 1880. (Thanks Barry, Peter)

David VK3QV was active on 10 mx s.s.b. during the "CQ" W.W. Contest, and noted:

(1) OH2AM and OH5SM were loud and clear as early as 0520z (both days). (2) A CE3?? was heard at 0815z—no doubt via long path—the first CE ever heard here on 28. (3) FO8BS was on 28 but the Ws found him and that was that! It seemingly became impossible to raise a U.S. station they were all calling the FO8. 28 Mc. contacts for Oct. include, s.s.b.: DJ2YL, 3JB, 5LU; DK2BW, DL3DW, 4HJ, 4PM, 7AA; DU1BEN, I1K, 1UP, EP2GI, 2JP, FK8AU, BG F57RT, G2, 3, 5, 6, HB9ADD, AKJ, KB; HG2KRD, HL9US, WZ, HM1BB, HS1AF, MD, 3DR, TD, I1KN, KA7CS, W0ILI/KG6, KH6GEY, GPQ/6, KL7GLA, JDO; KR6KR, NR, RU, TAB, KX6DR, LA1H, 4ND; MP4BGX, OH1, 2, 3, 4, 5, 7; OM2DB, OZ1LO, 9SL, SM5, 7, 0; UA3, 9, 0, UB5WE, UF6CR, UJ8KAJ, UP2ER, UV3AAE, 9PI, PP; UW4IB, 6MA, VEs, VS6DR, VU2DKZ, Ws, XE1AAC, XW8CS, YV1LA, 9M2PO.

On 28 c.w.: DJ2XK, 2YL, 3WU; HB9UV, HL9KQ, JA1, 2, 3, 9; KA2RM, OH2OW, OK-1AHZ, SM7ANB, UA0KFG, Ws. (Thanks David. Peter.)

SUMMARY

Due to lack of space, QSL information will have to be left to next month.

Acknowledgments to LIDXA, G. Watts, G3UGT, ZL2AFZ, VK3QV, VK5BS, VK3AKN, VK3AUT, VK4PX, W4BRB.

Deadline for news is the end of each month. I would be glad to receive news over the air, yours truly is on 7015 at 12z every Monday night. All times GMT. 73, Peter.

V.H.F. NOTES

Well another year is rapidly growing to a close, the DX activity is on the increase, both on 6 and 2 metres, but alas, no reports of any activity on 432 Mc. Surely there is not the problem of t.v.i. on this band like there is on both 6 and 2 mx. Anyhow, enough of the moaning, now on to a few brighter subjects.

First, the 1968-69 Ross A. Hull V.h.f. Memorial Contest starts on Saturday, 7th December, 1968, and continues until Sunday, 12th January, [redacted]

Secondly, the Festive Season is near, so I would like to wish you all a Very Merry Christmas, a Very Prosperous New Year, and may your Xmas stockings be filled with some rare DX. 73, Cyril VK3ZCK.

P.S.—Many thanks to those who have contributed to this column over the past year and I hope that you will continue to do so in 1969.

VICTORIA

Reports indicate that this coming DX season will be one of the best experienced for some years.

Six Metres. Band openings which took place in late October enabled all States to work JAs at very good strength. The number of stations using 52-53 Mc. will be interested to know that the KR6s also operate in this band and are anxious to work into VK, while the JAs usually use 50-51.5 with the main activity between 1500 and 2200 E.A.S.T.

Two Metres.—For those who are only on this band things are also looking up, with openings to VKs 1, 2, 5 and 7 being quite common, but the occasional opening to VK4 will increase the DX activity on this band.

The VK3 V.h.f. Project Group has almost completed the 2 metre converter, a companion to the very popular 6 metre one which was published in "A.R." about 12 months ago.

Don't forget the Ross A. Hull V.h.f. Contest which starts on 7th December and continues until 12th January, 1969. 73, Robert VK3AUR.

Gippsland.—During the recent C.F.A. exercise much use was made of the 2 mx f.m. channels, with the assistance of a 52.525 Mc. f.m. link between Thorpdale and Mirboo North and h.f., and s.s.b. On the same week-end David VK3DY, from Maffra, and George VK-3ZCG, from Morwell, attended the V.h.f. Convention at Bendigo. This seemed to start the ball rolling as far as the DX goes, for since then some very good openings have occurred on 2 mx, mainly to VK5 and VK7, with a fair sprinkling of the northern VK3s.

WESTERN AUSTRALIA

The new committee of the West Australian V.h.f. Group are: President, John VK6ZGL; Vice-President, Harry VK6HP; Secretary, Edwin VK6ZAN, Treasurer, Cedric VK6CD/T, Committee, Neville Chamberlain, Wayne VK6ZDD and Tom VK6ZAF. Bulletin Editor, Harry VK-6HP; Technical Editor, Tom VK6ZAF, Bulletin Circulation, Roy VK6RY, Glen VK6ZFH, Bob VK6ZFY; Broadcast Officers, Kevin VK-6ZCB/T and Don VK6HK, Oscar Co-ordinator, Don VK6HK; QSL Officer, Laurie VK6ZEA, V.h.f. Records, Rollo VK6BO; Beacon Officer, Tony VK6ZDT; Press Correspondent, Percy VK6ZDC, Auditors, John VK6TU and Ray VK6KU.

The club station VK6VF is operated by D. E. Cook, VK6AW, and runs beacons on 52.006, 145.00 and 432.50 Mc. Another beacon should be in operation by the time these notes are being read. This is at Albany and will be on 144.5 Mc. with a beam on Adelaide and another on Perth. The power is about 60w to a converted Pye base station and is sited on a 1,500 foot hill with a good path to the East.

Nets used in this State are 52.585, 52.662, 53.8 and 52.020 Mc., all a.m., plus 52.656 and 146.00 Mc., both f.m. 73, Percy VK6ZDC/T.

NORTHERN TERRITORY

Activity from the Darwin area should be much greater this year, now that active Amateurs include Doug VK8KK, Jim ex VK5ZSI and myself (Bruce VK8AZ, ex VK3AZG). We are working on a Radio Booster Station at Cox Peninsula for Radio Australia. I hope to establish regular schedules on 20 and 40 metres with either VK3BA or VK3YO and possibly with VK3AZX, with all of whom I used to work. 73, Bruce VK8AZ.

NATIONAL FIELD DAY

The John Moyle Memorial National Field Day Contest, 1969, will be held from 0600 G.M.T., 1st February, 1969, to 0800 G.M.T., 2nd February, 1969.

The rules for this contest will be published in the next issue of "A.R."

STATE INTRUDER WATCH CO-ORDINATORS

New South Wales—
W. H. R. Treloar, VK2BPZ, 23/9 Fullerton St., Woollahra, N.S.W., 2025.

Victoria—
M. P. Davis, VK3ANG, 144 Tramway Pde., Beaumaris, Vic., 3193.

Queensland—
Cec. Kenny, 19 Lithgow St., Wynnum North, Qld., 4178.

South Australia—
W. J. Bulling, VK5KX, 297 Goodwood St., Kings Park, S.A., 5034.

Western Australia—
G. Allen, 263 Amelia St., Balga, W.A., 6061.

Tasmania—
D. H. Kelly, VK7DK, 56 Upper Brougham St., Launceston, Tas., 7250.

CONTEST CALENDAR

Until 31st Dec.: Concurso Mexico 1968 (L.M.R.E.)

7th Dec., 1968, to 12th Jan., 1969: **Ross A. Hull VHF Contest (W.I.A.).**

1st and 2nd Feb., 1969: John Moyle Memorial National Field Day (W.I.A.).

1st and 2nd Feb., 1969: 35th A.R.R.L. DX Test (Phone Section), first week-end.

1st and 16th Feb., 1969 A.R.R.L. Novice Round-up.

(C.w. Section), first week-end.

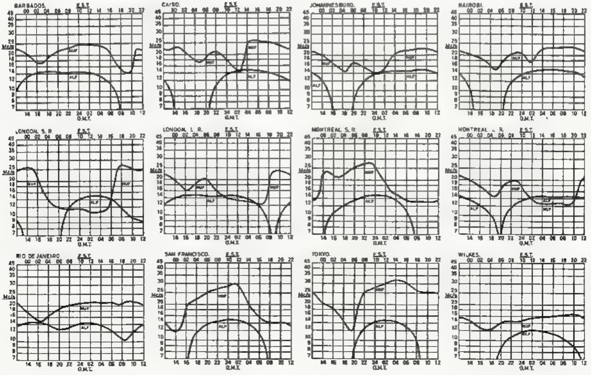
15th and 16th Feb., 1969: 35th A.R.R.L. DX Test

1st and 2nd Mar.: 35th A.R.R.L. DX Test (Phone Section), second week-end.

8th and 9th Mar., 32nd B.E.R.U. Contest (R.S.G.B.)

PREDICTION CHARTS FOR DECEMBER 1968

(Prediction Charts by courtesy of Ionospheric Prediction Service)



Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

S.W.R. INDICATOR CORRESPONDENCE

Editor "A.R.," Dear Sir,

In company with VK2JE (October issue of "A.R.") I thought that all who had gone beyond elementary electronics had discarded the belief that electrons rush along a conductor skin to the electric fluid postulated by very early scientists. Turning to page 34 of the October issue of "A.R." I read with amazement an advertisement for a Toroid Balun containing the statement "this device also prevents the wave which has been contained within the cable from tending to 'spillover' the extreme end and travelling back over the outer screen of the cable". Apparently there is still need to "labour the point" and carry the gospel of rational thought to the electronic heathens.

Listening recently to an Amateur station QSO I heard one remark that he was having trouble with reflected power, which, apparently having no other place to go on return from his mismatched radiator was dissipating itself on the plate of his final amplifier, causing considerable heating. Being so deeply immersed in the gobblydegook of standing waves and reflected power, this unfortunate station owner did not know that his badly mismatched transmission line was presenting so high a positive reactance that it had neutralised almost all of the negative reactance in the output of the final stage pi network, preventing it from tuning to resonance, hence the final valve heating. Missionary work must continue in attempts to dissipate the fairy tale fogs which cloud many Amateur minds.

The diagrams indicating diode current flow are for instantaneous conditions occurring with non-reactive resistive external loads for which the internal meter line terminating loads have been adjusted to balance magnetic and electrostatic (current and voltage) components so that equal magnitude potentials are generated at the diode terminals. When these are equal and opposite in phase, no current flows through the diode. If the external load possesses positive or negative reactance in addition to resistance, there will be a phase difference between magnetic and electrostatic components and the resultant two meter readings may be evaluated as indicating a reflected wave.

In practical operation the meters indicate the summation of multi-million rectified pulses. The nominal directions of flow of current in the two diagrams cover only one cycle. When r.f. power passes through the instrument, the "calibrate" meter will always indicate. Only under conditions of resistive mismatch, and/or reactive loading will the meter in the so-called reflected power position give an indication.

Recently I had the pleasure of a conducted tour by VK2DO over the 330,000 volt three-phase distributing centre at Yass and stood beside three enormous 16,000 k.v.a. reactors employed for correcting the leading power factor due to capacitance of the long line from Tumut power station. An amusing thought passed through my mind. Had the Snowy Mountain electrical engineers followed the orthodox philosophy of Amateur Radio station owners, the attempted solution of the line power factor problem might have been the construction of a Gargantuan sized S.W.R. meter and accompanying "Match-Box" at the Mt. Kosciusko end of the line!!!

Amateur Radio operators would be well advised to think in terms of power factor and reactance when dealing with transmission lines and equipment. The same principles as apply to 50 cycles engineering still hold true at millions of cycles per second if care is taken in handling the many more zeros in the calculation.

—J. G. Reed, VK2JR.

THE AMATEUR—HIS SKILL AND STATUS

Editor "A.R.," Dear Sir,

In reading the preface to the article on s.s.b. construction by our worthy brother VK2AOU, I feel disposed to give an answer to his questions about the Amateur and his skill and status. Not all have the skill or time of the writer, nor do they possess his flare for design and electronic engineering. The P.M.G. Dept. asks of the potential Amateur that he shows some knowledge of the art on theory, and sets him to work on no practical project that I have heard of. Until such demand is made on the part of the P.M.G., we shall have to be prepared to receive into our ranks hundreds of Amateurs who, while excellently equipped to discuss the theory of radio and electronics, are quite incapable of handling a soldering iron and side cutters. Proof of this is the fact that dealers in standard equipment are still in business, and for this service many Amateurs are grateful. Those who have the technical skill to "roll their own", as VK2AOU puts it, should not be too smug or self-righteous, but be prepared to recognise the hundreds of excellent Amateurs who have not the same ability at the bench.

I also presume that VK2AOU does not grind his own crystals, and is not above purchasing the component parts he puts together. Carry his argument to its logical conclusion, and he would scorn the assistance of all technical experts. Given another ten years, and what he is building today will be a crudity, and part at least of what he will build, will be constructed under a microscope. Technical advances will get far beyond the average Amateur and his workbench, and few Amateurs will have the technical ability to fabricate their own. Highly developed technical knowledge, however, will be quite another thing, and cannot be denied. The same might be said of today.

I am not one of the "new breed" mentioned, but look back to the days when all equipment had to be built in the shack and fixed condensers made from tinfoil and waxed paper, and spark coils had to be wound by hand. Today however, there is a different situation, and what goes for a "roll your own" is merely the assembly of purchased components. But the old men of radio who lathed parts for their switches, and made all parts to the last detail do not scorn the men of today who fling prefabricated parts together. It is all a matter of comparison and a little charity.

To such men who have the skill, I say may their shadows never grow less, but by all means leave the less skilled Amateurs to enjoy their hobby as they know best.

—"Harry," VK3HT.

R.T.T.Y.

Editor "A.R.," Dear Sir,

On 6th October a group of enthusiasts met and formed the Queensland Amateur Radio Teleprinter Group, which is to be known as the "QART" group.

It was resolved to advise others who may be interested in or concerned with the group activities.

It is proposed to operate on a local net frequency of 144.53 Mc. and also on 14.075-14.100 Mc. and 21.075-21.100 Mc., at times scheduled for mutual convenience with overseas operators.

Information of activity on other bands is sought.

Predominately British Creed page printers will be used on the American 60 speed standard.

Information on any r.t.t.y. equipment and parts is sought, particularly tape equipment.

Licensed operators in the group are VK4ZGL, VK4ZNP, VK4NP, VK4AI, and VK4PJ, all members of the Wireless Institute of Australia.

Communication with overseas and interstate r.t.t.y. groups is welcomed and overseas acknowledgments and comments are solicited.

For the group,

Peter H. Brown, VK4PJ.

CONTACTS WITH VK

Selama Estate Group,
Serdang, Kedah, Malaysia.

Editor "A.R.," Dear Sir,

As I contact Australia fairly frequently I keep a check list of VK stations worked for the first time. I might say that by no means do I work exclusively to Australia, and due to never having enjoyed a proper 24-hour electricity supply at any time out here, my Amateur hours are often limited.

Thus it was with some surprise on checking up that I find that yesterday a QSO with VK5DO resulted in my 1,000th VK station worked on phone.

I thought this was pretty good and would interest your readers. Of course many of the stations may have now changed their calls or no longer on the air and many were in the old VS2DQ a.m. days. But it has been a pleasant surprise to me to recently meet once again now newly on s.s.b. so many of the older VK stations which I used to work on a.m.

The distribution works out as follows: VK1, 10 stations worked, VK2, 240; VK3, 288; VK4, 114; VK5, 138; VK6, 107; VK7, 22; VK8, 10; VK9, 42; VK0, 20; total of 1,000.

QSL cards received from just under 500 stations.

Thanks very much to all these Amateurs for so many splendid QSOs which have given me much pleasure and I hope that we will be able to work you all for many years to come.

—James C. Pershouse, 9M2DQ, ex VS2DQ.

P.S.—Any estimate of how many active VK stations there are on the h.f. bands? [Can anybody help.—Ed.]

HAMADS

Minimum $1 for forty words.
Extra words, 3 cents each.

HAMADS WILL NOT BE PUBLISHED UNLESS ACCOMPANIED BY REMITTANCE.

Advertisements under this heading will be accepted only from Amateurs and S.w.l's. The Publishers reserve the right to reject any advertising which, in their opinion, is of a commercial nature. Copy must be received at P.O. 36, East Melbourne, Vic., 3002, by 5th of the month and remittance must accompany the advertisement.

FOR SALE: Galaxy Accessories AC Power Supply $40; plug-in 100 kc. Xtal Calibrator $7.50; Remote VFO, 5-5.5 Mc. 6AU6, 12AT7 $30. McCoy 50 ohmer Transmatch with SWR bridge and RF voltmeter, $8. Three sistor speech compressor 6 in speaker, h/phone o/p in 1 unit, $6. Ron Sedunary, VK5KS, 9 Everest Ave., Morphettville S.A., Phone 95-7938.

SALE: Special Receivers for SWL's [four]. All equipped with Product Detectors, S Meters, Noise Limiters, etc., and in first class condition. Two at $50, one at $70, one at $120. H. L. Roach, 28 Foster Avenue, Glenhuntly, Vic. Phone 58-3757.

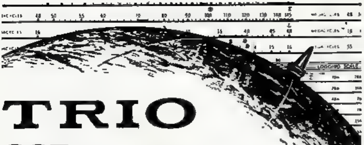
WANTED: Bendix Frequency Meter with AC Power Supply. Details to P.O. Box 57, Raymond Terrace, N.S.W., 2324.

WANTED: Circuit Diagram for AR88 Communications Receiver. If need be, will pay for circuit or return after copy made. Contact John Thornton, VK4ZJT, C/o. Telephone Exch., Pialba, Qld., 4655.

WANTED: Commercial or equivalent A.C. P.S.U. for the ANART13 Tx, also manual. Also an unmodified AR8 Rx and a 122 Vibrator Power Supply. W. Babb, VK3AQB, Yarraville, Vic. Phone 68-4513.

WANTED: Teleprinter Tape Reperforator and Tape Transmitting Equipment. Prefer Creed. VK4NP, P.O. Box 81, Albion, Brisbane, Qld., or Phone 62-1351.

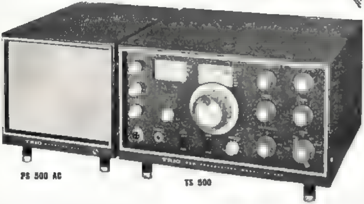
WANTED TO SELL: K.W. Viceroy SSB Transmitter and Power Supply. Nearest offer, $200. G. Bolles, 404 Geelong Road, West Footscray, Vic., 3012.



TRIO

SSB transceiver

200 watts PEP–7 Bands–A M & C W and Power Supply and Speaker Unit



PS 500 AC

TS 500

SPECIFICATIONS:

Frequency:

80m Band	3.5-4.0 MHz
40m Band	7.0-7.5 MHz
20m Band	14.0-14.6 MHz
15m Band	21.0-21.6 MHz
10m A Band	28.0-28.6 MHz
10m B Band	28.5-29.1 MHz
10m C Band	29.1-29.7 MHz

Communication Method: SSB (A3j), AM (A 3H), CW (A1)

Maximum Input Power: (Xmitter final stage) 200W (PEP)

Standard Input Power: (Xmitter final stage) 180W (PEP) 120W on 28 MHz band only

Antenna Input Impedance: 50-75 ohm

Carrier Suppression Ratio: More than 40 dB

Single Side Band Ratio: More than 40 dB

Mic. Input Impedance: High impedance (dynamic or crystal mic. recommended)

Xmitter Audio Frequency Characteristics: 300-3,000 Hz (-6 dB)

Receiver Sensitivity: 1µV S/N 10 dB (14 MHz)

Receiver Selectivity: 2.7 kHz (-6 dB) 5.0 kHz (-55 dB)

Spurious Rejection Ratio: More than 45 dB

Image Ratio: More than 60 dB

Undistorted Power Output: More than 1W

Receiver Output Impedance: SP 500 ohm PHONE 8 ohm

Power Consumption (using PS-500AC): 450W (At maximum power output) 250W (Receiving Mode)

Tubes and Transistors used: 17 TUBES, 3 TRANSISTORS, 15 DIODES

Dimensions: W: 13½"; H: 8½"; D: 11½"

Weight: 17.6 lb

FOR/FOA SYDNEY: TS 500, $491.00; PS 500 AC, $98.00

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FLDX-2000 Linear Amp.
80-10 mx, AB2 G.G.

SP-400
Speaker

FRDX-400 Receiver
160-2 mx, WWV, C.B.

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FTDX-400 Transceiver
80-10 mx, peak inp. 500w.

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80-10 mx, Transistorised, 150w.

FT-50 Transceiver
80-10 mx, peak inp. 100w.

FV-50 V.F.O.

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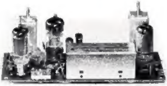
For T.V.I. reduction



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